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BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

894. REIDY, MARGARET M. **Ecology.** School Sci. Math. 19: 131-131 Feb., 1919. To survive, plants and animals must solve the problems of food and protection. Adaptations of insects and flowers are of special interest. The sunnich fruits afford food and shelter for many insects. The carpenter bee excavates path of sunnich. Other similar cases furnish topics of great interest for high schools. -A. Gaudersen.

895. VAN CLEAVE, H. J. **The field excursion in high school biological courses.** School Sci. Math. 19: 7-10, Jan., 1919. Definiteness of object is very essential. Object must be distinctly limited, as "Insects as carriers of pollen," "Birds as carriers of seeds." -A. Gaudersen.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

896. ALWAY, F. J., G. R. McDOLE, AND R. S. TUTTIBULL. **Relation of minimum moisture content of subsoil of prairies to hygroscopic coefficient.** Bot. Gaz. 67: 185-207 Mar., 1919. Soil moisture studies were carried out on the prairies of Nebraska both in the semi-arid parts of the state dominated by the short-grass and in the more humid portions near Lincoln characterized by the prairie-grass associations. Samples were taken at intervals over a year period at different depths and the water content and hygroscopic coefficient determined, the moisture conditions being expressed as the ratio of these two findings. This ratio gives not only the relative moistness but also indicates whether free water or growth water is present. The subsoils of the semi-arid regions were found to be persistently dry, the ratio ranging from 1.5 to 1.1 and after droughts decreasing to 1.0 to depths of 6-12 feet. Even extreme and prolonged droughts brought no further reduction of moisture content. Humid prairies showed no reduction of moisture content in their subsoil during drought to a greater depth than 5 feet, the deeper subsoil exhibiting a ratio of 2.0 to 2.4. The dry condition of the subsoil in the semi-arid portions is attributed to the presence of perennials with a root range of 15 feet or more, similar plants being absent or few in the more humid regions. In the arid portions during wet periods following droughts the upper moistened portion of the subsoil will be isolated from any deeper lying moist layer by a zone in which the subsoil is too dry to permit the penetration of plant roots. -Geo. D. Fuller.

897. BENECKE, W. Pflanzen und Nachtschnecken. [Plants and Slugs.] Flora 111, 112: 450-477. 1918.—In a paper primarily zoological in content, author divided slugs according to their food preference into pleophagous, herbivorous, and mycophagous species. When offered agar disks saturated with certain food substances, pleophagous species ate either sugar or proteid disks, mycophagous species preferred peptone agar, and herbivorous forms sugar agar. Glycogen, which occurs in certain fungi, was an attraction to two species, while mannite had no effect. Both pleophagous and mycophagous species ate many species of agarics, but not all species tried. Several species, notably acid forms of *Russula* and *Lactarius*, were eaten more readily by mycophagous slugs. Several species poisonous to man, including *Amanita muscaria* and *A. phalloides*, were eaten readily. The author accepts Stahl's old conclusion that many plants are protected against slugs by their mechanical properties, but does not know whether mechanical devices are of equal efficiency against all three food-classes. —H. A. Gleason.

898. BETTS, M. WINIFRED. Notes on the autecology of certain plants of the Peridotite Belt, Nelson. Part I.—Structure of some of the Plants. (No. 1). Trans. New Zealand Inst. 50: 230-243. 15 fig. June, 1918.—This is the initial number of a series of short papers to describe the anatomy of a number of representative plants of the Mineral Belt. These plants belong to three principal associations: (1) Shrubland, (2) Open Scrubland and a Tussock Grassland. Nine plants are considered in this paper and the description of leaf and stem anatomy together with growth-form is given. —P. D. Strausbaugh.

899. DIELS, L. Über Wurzelskork bei Pflanzen stark erwärmter Boden. [Periderm in plants of heated soils.] Flora 111, 112: 490-502. 3 fig. 1918.—Author describes the structures appearing at or near the surface of the ground on various species of Australian xerophytes. These include a copious development of scales or hairs, very lacunar cortex, and conspicuous development of the periderm. Without denying the effect of such structures in reducing transpiration, he infers that they are of chief value as insulation against the superheating of tissues from contact with the hot soil, which probably reaches temperatures of 55-65°. He made no measurements of actual soil temperatures nor of the internal temperature of the plants with these structures. —H. A. Gleason.

900. DUFRENOY, J. Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological conditions in the development of parasitic fungi.] Bull. Soc. Mycol. France 34: 8-26. June, 1918.—A comparison of collections made at elevations at 1200 to 2000 m. in the Pyrenees with those listed by Fragoso for Catalonia Spain. Most of the fungous diseases found in Catalonia have been found in Barèges. The Pyrenees are not a barrier to the dissemination of the fungi.—There exists, however, certain differences between the French and Spanish floras. They are for the most part explained by lack of data on the mycological flora of the Pyrenees. 18 of the 25 rusts found in Barèges are reported by Fragoso for Catalonia but Fragoso does not record *Puccinia simplex* on barley, or *Melampsorella caryophylleum* on fir.—A study of the distribution in altitude of fungous diseases leads to the conclusion that there exists among parasitic fungi, species of the plain, species of the mountains and species occurring indifferently. The factor determining the specialization seems to be not temperature nor humidity but radiation. The species of the plain slightly pigmented, cannot stand the intense radiation of high altitudes. The species of the mountains have strongly colored spores or are protected by the color reaction of the host.—Any influence of altitude on the occurrence of fungous diseases depends on internal unknown factors in each host, and if the host is modified in its susceptibility, it has not been determined.—There is a short chapter on biotic factors and fungous parasites in which is discussed fungi attacking other fungi and fungi attacking insects. —D. Reddick.

901. FULLER, GEORGE D., AND A. L. BAKER. Raunkiaer's "Life forms," "leaf-size classes," and statistical methods. Plant World 21: 25-37, 57-63. Feb., Mar., 1918. [Translations of two papers: RAUNKIAER, C. Om Bladstørrelsens Anvendelse i den biologiske Plantegeografi.

Bot. Tidskr. 33: 225-240. 1916. RAUSKJÆR, C. Om Valensmetoden. Bot. Tidskr. 34: 304-311. 1917.] The importance of leaf size in relation to environment is discussed. Phanerophytes (tall woody plants) are subdivided by the author into six classes with leaf sizes between the limits given: leptophylls (less than 25 sq. mm.), nanophylls (below 225 sq. mm.), microphylls (2025 sq. mm.), mesophylls (18,225 sq. mm.), macrophylls (164,025 sq. mm.), megaphylls (above last figure). This classification may also be applied to chamaephytes. Its use is shown to give more exact results to statistical studies of vegetation.—The valence method provides the means of determining the biological spectrum in a manner that takes account of the relative frequency and areal extent of the plants of the several life forms.—*Forrest Shreve*.

902. HARPER, R. M. Some dynamic studies of Long Island vegetation. *Plant World* 21: 38-46. 1918.—The herbaceous vegetation was removed from one square yard in each of seven grass formations, and determinations were made of net weight, dry weight and ash.—The greatest dry weights and weights of ash were shown by *Phragmites* and *Typha*, the lowest by grasses of the Hempstead Plains. Comparisons are made with similar work in other regions.—*Forrest Shreve*.

903. HARPER, ROLAND M. A phylogeographical sketch of southern Maryland. *Jour. Washington Acad. Sci.* 8: 581-589. Nov., 1918. In his study of this area the author has divided it into 5 separate divisions: (1) the fall-line clay hills, (2) the green sand belt, (3) the bay shore hills, (4) the Brandywine plateau, and (5) the St. Mary's region. These regions are described separately and a list of the commonest trees found in each is given with brief notes concerning the shrubs and herbaceous forms. [See Bot. Abstr. 1, Entry 1153.] —*P. D. Strausbaugh*.

904. HARPER, ROLAND M. A new seasonal precipitation factor of interest to geographers and agriculturists. *Science* 48: 208-211. Aug., 1918. A brief description is given of a new precipitation map of the United States which indicates the regions receiving an early summer rainfall on the one hand, and those characterized by late summer rainfall on the other. The author uses this map as a basis in pointing out certain correlations between this distribution factor and the soils, and also the vegetation types associated with these soils. [Abstr. in *Exp. Sta. Rec.* 39: 511. 1918.] —*P. D. Strausbaugh*.

905. KEARNEY, THOMAS H. Plant life on saline soils. *Jour. Washington Acad. Sci.* 8: 109-125. Mar., 1918.—A general review of the more important facts concerning halophytic vegetation. Among other things the author discusses the distribution, structure and water economy of halophytes; osmotic pressure in roots and leaves, salt content of the tissues and the importance of sodium to halophytes and in plant nutrition in general. [Rev. by MACDOUGAL, calling attention to bibliographic omissions, in: *Plant World* 21: 161. 1918.] —*P. D. Strausbaugh*.

906. MACCAUGHEY, VAUGHAN. An endemic *Begonia* of Hawaii. *Bot. Gaz.* 66: 273-275. Sept., 1918.—The Begoniaceae are almost entirely without representatives in the Pacific region, their greatest display being in the Andean portion of South America as far north as Mexico, and in the Himalayas extending southwest to the Malay Peninsula. Two of the four genera are monotypic; one of these, *Symbegonia*, occurs in New Guinea, and the other, *Hillebrandia*, is found only in Hawaii. The presence of this endemic form, *Hillebrandia panducensis*, in the Hawaiian flora furnishes additional evidence that "at one time in the history of the Pacific Basin the Hawaiian Islands were much more closely associated with the Andean and South Pacific regions than they are at present." This endemic species lives in shady places near water-falls or in the depths of shaded ravines, with an altitudinal range of from 3000-6000 feet.—*P. D. Strausbaugh*.

907. MACDOUGAL, D. T. [Rev. of: KEARNEY, T. H. Plant life in saline soils. *Jour. Washington [D. C.] Acad. Sci.* 8: 109-125. Mar., 1918.—(See Bot. Abstr. 2, Entry 905.)] *Plant World* 21: 161. 1918.

908. OSTENFELD, C. H. Stray notes from the tropical West Australia. Dansk. Bot.-isk. Arkiv. 2: 1-29. 9 fig., 3 pl. 1918.—This account is based on observations made during hasty visits at five of the ports and deals with the vegetation of the coastal region only. Five formations are mentioned and described: (1) the mangrove formation; (2) the sandy sea-shore formation; (3) the salt pan formation; (4) the sand dune formation, and (5) the savannah forest. A list of the species collected is appended.—P. D. Strausbaugh.

909. ROBBINS, W. W. Successions of vegetation in Boulder Park, Colorado. Bot. Gaz. 65: 493-525. 14 fig. June, 1918.—Two successions are described; one, a hydrarch succession associated with the glacial lakes and the silt-sand flood plains; the other, a xerarch succession involving the level, gravel areas exposed by the rapid drainage of the old glacial lake which formerly covered the major portion of the Park, and the flood plains of coarser materials, such as small boulders and coarse gravel. In the hydrarch succession the initial stage is an *Eleocharis-Ranunculus* association followed by the sedge moor; this gives place to the willow thicket which in turn is followed by meadow grassland or meadow scrub. This succession is best observed on the borders of the oxbow lakes. This meadow culmination is regarded as a temporary climax only. The cobblestone flood plains represent a habitat characterized by rather extreme conditions of temperature and moisture supply. The initial stage is xerophytic consisting of a few plants including mosses, struggling to establish themselves in the loose sediment between the stones. This is followed by a mixed community that gives way to the willow thicket followed by the meadow scrub. The willow thicket may be succeeded by sedge moor which sometimes remains for a long period. "The seasonal aspects of the sedge moor change slowly" owing to the fact that species are relatively few and the dominance of *Carex* conceals the other forms. Even more important are the soil, temperature and moisture factors which show the least seasonal fluctuation in this stage. "Elaphoglossum conditions within a community control the seasonal changes of the vegetative covering." *Lirichens* and *Selaginella densa* take first possession of the glacial gravels and are followed by a mixture of xerophytic forms and the incoming of grasses passing at once into the characteristic "dry grassland" of these areas. Dry grassland has all appearances of being the culminating stage but "the combined activities of biotic and physiographic factors are resulting in the slow disappearance of the dry grassland and the establishment thereupon of a mesophytic grassland." Though the Park is fringed by three forest associations there is no evidence of invasion of the meadow by trees due to the fact that the extreme conditions of exposure in these areas make it very difficult for tree seedlings to acquire a foothold. The author makes note of the scarcity of aquatic plant life in the lakes and ponds of the park and believes that the paucity is due in part to the coldness of the waters, and in part to the absence of necessary salts from the very soft water of these lakes.—P. D. Strausbaugh.

910. ROBERTSON, CHARLES. Pollination of *Asclepias cryptoceras*. Bot. Gaz. 66: 177. Aug., 1918. A brief query concerning mode of pollination in *Asclepias*. Author believes that in *Asclepias cryptoceras* pollination may be effected by other long-tongued bees or butterflies as well as by bumblebees.—P. D. Strausbaugh.

FOREST BOTANY AND FORESTRY

RAPHAEL ZOX, Editor

911. ARNOULD, A. L'impôt forestier en Angleterre. [Forest taxation in England.] Revue of; BUCCLEUGH, DYKE OF. Taxation of woodlands. Trans. Roy. Scot. Arb. Soc. 32: 160-173. 1918. Rev. Eaux et Forêts 57: 2-3. 1919.—The increasing burden of taxation of forest property is not peculiar to France, but exists also in England. In two specific instances there taxes amounted to 122 per cent and 132 per cent of the total revenue. Forest property are the only kind of property subject to the so-called "death duty" of 21 per cent and also to income and super-taxes amounting to 52.5 per cent. Because of the heavy burden imposed by this double taxation reforestation is financially unprofitable.—The author expresses the hope that forest owners in England will be able to secure a fair and rational income tax for forests which can be adapted to French conditions.—S. T. Dana.

912. BARBEY, A. *Chronique Suisse*. [Swiss notes.] *Rev. Eaux et Forêts* 57: 21-24. 1919.—Increased demands for wood, largely for American barracks in France, have caused a considerable advance in wood prices during the past year. Transportation of forest products has been difficult. Price fixing for coniferous timber has been inaugurated by the Government, and special steps have had to be taken by the cantons to keep the pulp and paper factories in operation. The war has emphasized the need for careful management of Switzerland's forest resources under the direction of technically trained men, in order to wipe out the annual deficit of 700,000 cubic meters in the production of forest products which existed in 1913. The Canton of Vaud in 1918 furnished an example worthy of imitation elsewhere by increasing the number of local foresters from 11 to 20. This resulted in reducing the area, of from 7000 to 11,000 hectares, formerly assigned to each forester, to 4000 hectares.—S. T. Dana.

913. BOEKER, R. H. D. *Our national forests*. New York, 1918. See Bot. Absts. 2, Entry 917.

914. BUCCLEUCH, DUKE OF. *Taxation of woodlands*. *Trans. Roy. Soc. Arb. Soc.* 32: 169-173. 1918.—See Bot. Absts. 2, Entry 911.

915. CHANCEREL, L. *Les meilleures essences de boisement dans la région du Centre*. [The best species for forestation in the region of the Centre.] *Rev. Eaux et Forêts* 57: 31-34. 1919. Certain planting experiments undertaken in November, 1909, on poor, silicious soils, very dry in summer and wet in places in winter, indicate *Quercus pedunculata*, *Q. robur*, *Q. phellos*, *Betula nigra*, *Alnus cordifolia*, *Populus balsamifera*, and *P. nigra* var. *angulata robusta*, as the best broadleaf trees for the region, to secure a quick growth and improvement of the soil. *Pinus maritima* var. *corte* (in mixture with *P. sylvestris*), *Pseudotsuga douglasii latifolia*, *Picea menziesii*, and *Cedrus deodara* are similarly regarded as the best coniferous species for the region. Elm, maple, basswood, ash, hornbeam, chestnut, hickory, and walnut proved unsuitable.—S. T. Dana.

916. DEMORLAINE, J. *L'importance stratégique des forêts et la guerre*. [The strategic importance of forests in the war.] *Rev. Eaux et Forêts* 57: 25-30. 1919. In addition to their value as producers of wood for military purposes, forests have a tactical importance in war by furnishing local shelters for machine guns, observation outposts, etc., and, where they occur in continuous stands over a considerable area, a strategic importance by furnishing shelter for large bodies of troops. The German advance across the Vosges mountains in 1914 was stopped by the great forests of Alsace, the Vosges, and Lorraine. Paris was saved both in 1914 and 1918 by the forests of Villers-Cotterets and of Compiègne. In 1918 the German retreat was favored by the great forests of the Ardennes. The French forests should be given a long period of rest, and the Germans forced to replace in kind the wood for the destruction and premature use of which they have been responsible. Intensive hunting in the devastated forests should be stopped, and the game should be allowed to keep the rodents in subjection, which have largely disappeared as a result of military occupation.—S. T. Dana.

917. GAGER, C. STUART. [Rev. of: BOEKER, RICHARD H. DUFAL. *Our national forests*. New York, 1918.] *Torreya* 19: 14-15. 1919.—The book is invaluable as a survey of the history and activities of the U. S. Forest Service, and of the need and value of its work. It is specially recommended as a reference book.—J. C. Nelson.

918. GUYOT, CH. *Jurisprudence*. [Legal matters.] *Rev. Eaux et Forêts* 57: 4-5. 1919. —There is nothing in the Code forestier, or in other laws of France, to prevent a private owner from appointing a woman as forest guard. When such an appointment is agreed to by the prefect or subprefect, the civil court must accept the oath of office of the woman so appointed provided no other legal barrier to the appointment exists.—S. T. Dana.

GENETICS

GEORGE H. SHULL, *Editor*

919. ALDERMAN, W. H. **Experimental work on self-sterility of the apple.** *Proc. Amer. Soc. Hort. Sci.* 14: 94-101. 1918.—See Bot. Absts. 1, Entry 937.

920. ANONYMOUS. **Plant breeders find new tobacco hybrid.** *Jour. Heredity* 9: 354-356, Fig. 7-8. Dec., 1918.—Montgomery Seedleaf tobacco (Hybrid No. 199) is result of cross between Washington (Ohio) Seedleaf and Big Graham. Parents have drooping leaves, hybrid erect. Latter is productive and seems to possess drouth resistance.—*R. J. Garber.*

921. ANONYMOUS. **Environmental factors and heredity differences influencing fruiting of cotton.** *Jour. Heredity* 9: 372-374. Dec., 1918.—Quotations from EWING, E. C., *Technical Bull.* 8, Mississippi Agric. Coll. 93 p. June, 1918. Discusses importance of earliness as it involves resistance to boll weevil, and mentions several factors that go to make up earliness.—*Merle C. Coulter.*

922. ANONYMOUS. **Heredity of tumors of the nerves.** *Jour. Heredity* 9: 380-381. Dec., 1918.—PREIBER AND DAVENPORT (*Amer. Jour. Med. Sci.*, Oct., 1918) published evidence interpreted to mean that multiple neurofibromatosis is Mendelian dominant. In this disease sessile or pedunculated swellings of variable size, containing nerve fibres, appear on body. Number varies and increases with age. Hashimoto (1890) made out 4503 on middle-aged Japanese men. Since only one case in 2000 coming to clinics for skin diseases is of this sort, affection is very rare. It occurs in father and child quite as frequently as in mother and child and is therefore not transmitted through placenta. In some cases it actually seems to skip a generation, but authors consider this may be due to occasional failure of a dominant trait to appear, as in polydactylism of fowl. Assertion is made that trait is dominant. There are 243 cases described of which 158 had one parent affected. In 34 cases neither parent was recorded as affected. The other 51 cases were left out of "families charted." There are then at least 65 per cent showing direct descent, but further evidence is needed to include this as an undoubted Mendelian dominant.—*P. W. Whiting.*

923. ANONYMOUS. ["B."] [Rev. of: ZIEGLER, H. E. *Die Vererbungslehre in der Biologie und in der Soziologie, usw.* (Genetics in biology and sociology, etc.) (See Bot. Absts. 2, Entry 963.)] *Anat. Anzeig.* 51: 511-512. Dec. 30, 1918.—Ziegler's emphasis on theory of chromosomes and their reduction as solution of results of experimental genetics differentiates him from investigators like Johannsen who neglect it, or like Plate and Goldschmidt who only incidentally notice this theory. Section of book on problems of sociology and political science represents Ziegler's life work; his deductions in these fields are based on biological grounds. Reviewer thinks it hopeless at present for scientific facts to influence views of politicians or mass of people.—*J. P. Kelly.*

924. ANONYMOUS. **"Diluting" colors of carnations.** *Florists' Exch.* 47: 285. Feb. 15, 1919.—Refers to attempt of New Jersey Experiment Station to secure scarlet carnation by crossing maroon variety, Princess Dagmar, with white variety called Matchless; seedlings that resulted were widely varying but no mention is made of scarlet among them.—*J. P. Kelly.*

925. BABCOCK, E. B., AND J. L. COLLINS. **Genetics laboratory manual.** 1st ed. 16 + 22 cm., xi + 56 p., 14 fig. McGraw-Hill Book Co.: New York. 1918.—Intended to supplement combined lecture and recitation course consisting of one 3-hour period a week for 15 or 16 weeks. Exercises comprise four lines of study; (1) *Drosophila* breeding experiments; (2) Variation in plants; (3) Mendelism in plants; (4) Plant and animal breeding. Three alternative exercises are suggested under most of the numbers thus permitting course to be varied from year to year. Appendix contains Pearl's table for testing goodness of fit in Mc-

delian ratios, instructions for rearing *Drosophila* for class use and research, list of laboratory materials needed for *Drosophila* experiments, and list of selected works for reference, and periodicals treating of variation, heredity, breeding and evolution. E. E. Barker.

926. BOULENGER, G. A. L'évolution est-elle réversible? Considérations au sujet de certains poissons. [Is evolution reversible? Considerations relating to certain fishes.] Compt. Rend. Acad. Sci. Paris 168: 41-44. 1919.—See Bot. Absts. 3, Entry 595.

927. BOULENGER, G. A. Un cas d'évolution ontogénique à rebours chez un lézard africain (*Eremias lugubris* A. Smith). [A case of reversed ontogenetic evolution in an African lizard (*Eremias lugubris* A. Smith).] Compt. Rend. Acad. Sci. Paris 168: 78-80. 1919.—See Bot. Absts. 3, Entry 599.

928. BURKHOLDER, W. H., I. M. HAWLEY, AND E. W. LINDSTROM. Some results of the New York State bean investigation. Proc. New York State Fruit Growers' Assoc. 16: 120-125. 1918. [See Bot. Absts. 1, Entry 84.]

929. COCKERELL, T. D. A. Hybrid perennial sun-flowers. Bot. Gaz. 67: 261-266. Mar., 1919.—Several supposed hybrids between various species of perennial sunflowers are noted and in one case, described in detail. Such hybrids could reproduce vegetatively and give rise in nature to a uniform group of plants of considerable extent with aspect of true species, *Helianthus orgyaloides*, nov. is presumably a hybrid between *H. orgyalis* DC. and *H. Maritimi* Schrad. A form of this hybrid is known to the trade. Possibly, through hybridization in the genus *Helianthus*, new forms with attributes of species may be demonstrated. Orland E. White.

930. COLLINS, J. L. Chimeras in corn hybrids. Jour. Heredity 10: 2-10. 7 fig. Jan., 1919.—Mosaic seeds of maize having part colored and part uncolored areas and other seeds having part starchy and part wrinkled areas in the endosperm of hybrid seeds in which the dominant characters came from male parent are considered to be due to mutation in somatic tissue. An F_2 partly colored seed, if it is found that the embryo is homozygous for the color, is expected to furnish proof, between the former idea of Correns and of Weldon of independent development of female and male nuclei and the theory of mutation as the cause. Somatic segregation is not considered a possible interpretation. Occurrence of similar phenomena in fig, canna lily and gladiolus is mentioned and illustrated. D. F. Jones.

931. COOK, O. F. Evolution through normal diversity. Jour. Washington Acad. Sci. 9: 192-197. April 4, 1919.—Attention is directed to the observation of THOMAS MECHAN (Contribution to the life-histories of plants. No. X. Proc. Acad. Philadelphia 1894: 53. 1814.) "that there is an innate power to vary coexistent with the species itself, independent of any conditions of environment." Author points out that bearing of this conception upon evolutionary progress was obscured by Meehan's belief that contrasted characters would tend to disappear through swamping effect of intercrossing. Persistence of many divergent or contrasted characters in hybrid populations is recognized as refuting this hypothesis and idea that diversity is lost through crossing is now discarded. Instead of tending to impede evolution, intercrossing of lines of descent in species is held to present the condition most favorable for preservation and extension of new characters. With this fact recognized it follows that new characters may be preserved in natural species without individuals being segregated by selection or otherwise.—Author disapproves tendency of geneticists to regard species as consisting normally of uniform, identical individuals, because in nature endless individual diversity is found, which accords with conception of continued development and gradual diffusion of inherited characters among the members of a species. Conclusion is reached that "phenomena of variation and diversity are largely differences of expression, including that of accommodation, or varied expression of adaptive characters, to suit different conditions of existence."—Evolution is defined as process of continuous integration and differentiation of characters, the two essential conditions of which are normal diversity ("heterism"), and free intercrossing of lines of descent ("sympathy").—J. H. Kempton.

932. DELAGE, YVES. Suggestion sur la nature et la causes de l'hérédité ségrégative (caractères mendéliens) et de la hérédité agrégative (caractères non mendéliens). [Suggestion as to the nature and the causes of segregative heredity (Mendelian characters) and of aggregative heredity (non-Mendelian characters).] Compt. Rend. Acad. Sci. Paris 168: 39-36, 1919.

933. DEVRIER, HUGO. Kreuzungen von *Oenothera Lamarckiana* mut. *velutina*. [Crosses of *Oenothera Lamarckiana* mut. *velutina*.] Zeitschr. indukt. Abstamm. Vererb. 19: 1-38, Mar., 1918.—*Oenothera Lamarckiana* mut. *velutina* (syn. *O. Lamarckiana* mut. *blandina*) is a slender, narrow-leaved mutant with a loose inflorescence and resembles *rubrinervis* more closely than its parent *Lamarckiana*. It is further distinguished by having a high percentage of fertile seeds and does not give the twin hybrids *laeta* and *velutina* but on the contrary uniform hybrids of the latter type when crossed with other species; this indicates that *laeta* gametes are not formed and that the plant is pure *velutina*. Crossed with *Lamarckiana* the first generation presents *laeta* and *velutina* hybrids but the former group consists of two types differing in respect to their heritable characters and named respectively *laeta letalis* and *laeta rediviva*. More than half of the seeds of *laeta letalis* are sterile and its offspring, when selfed, are uniform; it throws no *velutina*. In contrast, *laeta rediviva* has almost no sterile seeds and splits into *velutina* and *laeta* the latter presenting three types, (1) one with reddish leaves, (2) one with green leaves, and (3) a form intermediate, in the ratio of 1:1:2. The first two types when selfed are constant; the third form, making up about half of the assemblage splits into the same three types and in the same ratio.—The results of other crosses are reported and also a number of crosses involving several different species of *Oenothera*. There is discussion of lethal factors in *Oenothera Lamarckiana* and of mass mutation.—B. M. Davis.

934. DOLLFUS, ROBERT. Continuité de la lignée des cellules germinales chez les Trématodes Digenea. [Continuity of the germ-cell line in the trematode Digenea.] Compt. Rend. Acad. Sci. Paris 168: 124-127, 1919.—Investigations of larvae of a number of species of Digematata and Monostomatina gave following results: Sporocysts, rediae and cercariae arise from single germinal line of cells and not from somatic cells lying in walls of the sporocysts or rediae. Germ-cell line, which originates from blastomeres of fertilized egg, gives rise to sexual cells of adult and in course of life cycle of the trematodes, to somatic cells which form the tissues of these sporocysts, rediae, and cercariae. Thus somatic tissues of these larval forms take no part in origin of succeeding stage in life history of these organisms, and are "steriles" in this respect, but simply protect and transport germ-cell line. Author presents diagram showing continuity of germ cells from fertilized egg to fertilized egg of succeeding generation, with list of tissues on one side that disappear without producing descendants, and a list on other side that arise from germ-cell line up to formation of eggs by adult trematode.—R. W. Hegner.

935. FRUWIRTH, C. Die Umzüchtung von Wintergetreide in Sommergetreide. [The breeding of winter cereals into summer cereals.] Zeitschr. Pflanzenzücht. 6: 1-46, Mar., 1918.—Early spring planting of winter cereals permitted practically normal maturation in many cases. Later planting produced few fertile stalks or none at all. Species, varieties and selected lines differ in degree of normal production when planted together at different times. Exposure of seed to high and low temperatures and to chloroform previous to planting had no differentiating effect. Exposure of plants to different temperatures throughout the winter and at different intervals made no pronounced difference. By taking two lots of seed from the same head, in many experiments with different sorts of wheat, and planting one lot in the spring and the other in the fall during several years and then planting the two lines at the same time no differences were observed. A difference found with rye by the same method was attributed to a presumable heterozygosity made possible by natural cross-pollination. Common cereals of Europe considered to be originally winter forms. Some have lost ability to live over winter. Some have become particularly adapted to spring

planting and may or may not retain winter hardiness. Several varieties grown for many years as spring grains were shown to be still capable of fall sowing. Dual types which can be grown successfully by either fall or spring sowing were found to exist in many varieties. Changing of a winter form into a summer form consists essentially in sowing out of these different types.—D. F. Jones.

936. GLASER, O. C. **Inheritance of absence of the sense of smell.** Jour. Heredity 9: 347, Dec., 1918.—Certain person lacks sense of smell entirely. Strong odors are simply "felt." Brother and mother are likewise defective. First cousin shows same defect, coming, however, from another family. Locus of origin, in Russia, is apparently inbreeding this deficiency. It is safe to say that character is hereditary, although exact method is uncertain. [See Bot. Absts., 2, Entry 957.]—P. W. Whiting.

937. GOODALE, H. D., AND GRACE MACMILLEN. **The bearing of ratios on theories of the inheritance of winter egg production.** Jour. Exp. Zool. 28: 83-121, Apr. 5, 1919. Authors present a theory alternative to Pearl's, applicable to inheritance of fecundity in the domestic fowl. It may be stated as follows: Winter egg production falls into one of two classes—high (over 30) and mediocre (under 30); high fecundity depends upon simultaneous presence of two factors, *A* and *B*, while mediocre production depends upon presence of not more than one of these two factors in duplex, simplex or nulliplex condition; these two factors are inherited according to usual dihybrid scheme. For this theory author mentions following advantages: (1) It is simpler because it does not involve sex-linkage, (2) it accounts genetically for birds in the over-30 class, for which Pearl's theory requires supplementary explanation, and (3) the only marked departures from expected ratios are downward, i.e., there is a deficiency of high producers.—On basis of data presented, author concludes that Pearl's theory, though not disproved, is not of universal applicability. Author believes, however, that mode of inheritance of winter egg production remains to be ascertained and that problem should be approached from a new angle, namely that of inheritance of the several factors whose combined action results in production of given number of eggs for winter period. P. B. Hadley.

938. HALSTED, BYRON D. **Possible correlations concerning position of seeds in the pod.** Bot. Gaz. 67: 243-250, Mar., 1918. Study of the relationship between number and position of seeds in pod of Lima bean and viability of seed and character of pods produced. The modal number of ovules and seeds is three. Concludes that seeds from central region of pods are most viable and produce larger number of pods than do those from base or tip. Seed maturation and seed weight increases from proximal to distal end of pods. Seeds borne in pods in which a portion of ovules are aborted are heavier than those in which all ovules mature.—J. Arthur Harris.

939. HARLAND, S. C. **A note on the inheritance of anthocyanin pigmentation in castor bean crosses.** Agric. News, Barbados 17: 403, Dec. 28, 1918. Observations on crossing semi-wild type of castor bean with ornamental variety known as *Ricinus Gibbous*. Latter had red capsules, stems and leaves; former had green capsules and pink stems. F_1 had green capsules but red stems; F_2 consisted of 102 green-capsuled and 31 red-capsuled plants. Author refers to some variation in recessive class indicating modifying factors. F_1 seed color was intermediate brown; no F_2 red capsules contained F_1 seed color and author suspects genetic correlation [linkage].—James P. Kelly.

940. HARLAND, S. C. **Notes on inheritance in the cowpea.** Anthocyan colouration of stem and leafstalk, and New Era pattern of the seed coat. Agric. News, Barbados 18: 4-5, Jan. 11, 1919.—Cowpea varieties with anthocyanin near leaf and leaflet junctions crossed with 11 totally unpigmented kinds gave pigmented F_1 generation, and F_2 of parental types in ratio of 132 pigmented to 39 unpigmented. Of 15 F_2 pigmented plants tested, 4 were constant and 11 showed simple segregation again; single genetic difference is inferred. Inheritance of seed coat color determined in cross of cowpea varieties called New Era and Para; former has

seeds brown dotted with blue; latter has seeds pale cream unspotted. F_1 bore seeds like New Era with lighter spots; F_2 consisted of three seed types, New Era (including those like F_1), a new type that was brown and unspotted, and Para-type; ratio approximated 9:3:4. Two factors are assumed, R , producing brown pigment in seed coat, and E causing New Era pattern; E acts only in presence of R .—James P. Kelly.

941. HARLAND, S. C. Notes on inheritance in the cowpea. The color of the seed coat pattern. Agric. News, Barbados 18: 20. Jan. 25, 1919.—Data on some genetic relationships of black, brown, maroon, red and white coloration. F_2 from cross of brown and red gave ratio of 12 brown, 3 maroon: 1 red; brown parent interpreted as having factor N for brown and hypostatic factor M for maroon; red parent as lacking both. Red proved recessive [hypostatic] to all colors investigated and was crossed to pure white in Para variety; F_1 of 10 brown: 3 red: 4 white-seeded plants revealed latent N factor in Para; there is no maroon factor in Para; latter crossed with maroon variety gave brown-seeded F_1 of 12 plants, no F_2 was grown. Para crossed with black gave F_2 ratio approximately 9 black: 3 brown: 4 white; both Para and black are assumed to have N , with black also carrying B (black) and R (red) factors which Para lacked; B is without effect in absence of R . Factor R is prerequisite for expression of B , N , and M .—J. P. Kelly.

942. HARTWELL, B. L., AND S. C. DAMON. Miscellaneous experiments with corn. Rhode Island Agric. Exp. Sta. Bull. 173. 27 p. 1918.—Three distinct strains of White Cap flint corn crossed among themselves gave no increase in yield of grain for F_1 generation. The first hybrid generation from two strains differing in stover production yielded an intermediate amount. In one experiment the seed grains of Rhode Island White Cap corn were separated into groups of high and low specific gravity; light one yielded at rate of 81.1 bushels per acre and heavy ones at rate of 87.4 bushels per acre. Seed grain produced under crowded and uncrowded conditions gave no significant differences in yield in next crop. In one trial varying amounts of nitrogen supplied to seed-producing plants led to no differences in yield of progeny grown on uniform soil.—J. P. Kelly.

943. HARWOOD, W. S. New creations in plant life. New York, 1918. Rev. by ORLAND E. WHITE in: Torreya 19: 15-17. 1919.

944. IUSEN, HEMAN L. Synthetic pink-eyed self white guinea-pigs. Amer. Nat. 53: 15-130. 5 fig. Mar.-Apr., 1919.—Pink-eyed self white guinea-pigs lacking albino factor (C_a) were produced by mating a pink-eyed (pp) non-yellow (C_rC_r) tortoise (e^PeP) to a self red of composition, dark-eye (PP), full pigmentation (CC), non-extension (ee). F_1 's ($PpCCePe$) appeared ordinary tortoise. F_2 generation should give a pink (pp), non-yellow (C_rC_r), non-extended (ee) among 64 individuals. Since obtaining a large F_2 generation was necessarily slow, a $PpCCePe$ male was mated to a $PPCaCee$ female. One of the offspring, appearing somewhat like albino since he carried brown (b) recessive to black (B), proved to be dark-eye carrying pink-eye (Pp), non-yellow carrying albinism (C_rC_a), non-extended (ee). When mated to a pink-eye (pp), dilute carrying non-yellow (C_aC_r), tortoise carrying non-extension (e^Pe), he sired among twelve offspring one male and one female that were pink-eyed, non-extended, non-yellow, or the desired self white. When crossed with true albinos (C_aC_a), the female proved to be $pPpC_rCaee$ and the male $pPpC_rC_aee$. These two have produced 24 offspring, all white like themselves. In tests for recessive albinism, one of them, mated to a $PPEE$ albino, produced a dark-eyed self-black. These synthetic whites satisfy fanciers' standard better than general run of true albinos lacking pigment altogether. "Pink-eyed" (pp) albinos also have been produced and are up to standard. Another way of producing pink-eyed white would be to combine Castle's dark-eyed self white (extended white spotting) with pink-eye. These would be unstable in breeding tests. The production of pink-eyed white with all recessive factors except albinism would be of value in linkage experiments.—P. W. Whiting.

945. JELINEK, J. Beitrag zur Technik der Weizenbastardierung. [Contribution to the technique of wheat crossing.] Zeitschr. Pflanzenzücht. 6: 55-57. Mar. 1918. An expedient method of crossing wheat whereby two sorts are planted close together, head of female plant castrated and enclosed with head of male plant in same stage of development by wrapping the two with paper and tying at both ends. In this way crossed seed and selfed seed of male parent are obtained with little effort and less danger from contamination by undesired pollen. The former practice of castrating and pollinating by hand is compared with this process. In five years tested, hand transfer of pollen gave from 6.6-32.4 per cent of heads with seed and from 1.4-3.9 as the average number of seeds per head. During two years jointly-enclosed heads gave from 46.1-51.0 as the per cent of heads with seed and 2.9-4.6 as the average number of seeds.—D. F. Jones.

946. KIHARA, H. Ueber cytologische Studien bei einigen Getreidearten. Mitteilung I. [Cytological studies on several species of cereals. I.] Bot. Mag. Tokyo, 33 (No. 366): 17-38, 21 fig. Feb., 1919.—The F_1 hybrids between two different species of wheat possessing 14 and 21 chromosomes respectively (diploid!), as, e.g., *Triticum durum* and *T. vulgare*, have $14+21=35$ chromosomes, the species having greater number of chromosomes being used as pollen-plant in these hybridizations. In the heterotypic division of pollen-mother-cells of these hybrids 14 chromosomes derived from father and other 14 derived from mother form 14 bivalent chromosomes as usual, while the remaining 7 derived from father remain univalent, thus making 21 chromosomes in all. Fourteen bivalent chromosomes undergo longitudinal cleavage as usual and wander to two poles to form two daughter nuclei, while 7 univalent ones remain generally for long time in nuclear plate, though they are finally absorbed by normal chromosomes or form extranuclear nuclei. In F_2 and F_3 individuals 35 or 38 chromosomes were found. Reduction division of embryo-sac-mother-cell seems to take place in same way as that of pollen-mother-cell. In plant produced by back-cross of wheat-rye hybrid by wheat root-cells were examined; some individuals were found to possess 42 chromosomes, while others derived from same parent have only their 38. Author thinks that in wheat-rye hybrid the number of chromosomes increases in successive generations, maximum number being 42. S. Ikeda.

947. KNIGHT, L. J. Physiological aspects of self-sterility of the apple. Proc. Amer. Soc. Hortie. Sci. 14: 101-105. 1918.—See Bot. Absts. 1, Entry 964.

948. LITTLE, C. C. A note on the fate of individuals homozygous for certain color factors in mice. Amer. Nat. 53: 185-187. Mar.-Apr., 1919. Writer reports results of determining relative numbers of normal and abnormal fetuses formed when yellow mice are mated *inter se* and when they are mated to mice of another color. In former case, there were 21 normal and 21 abnormal fetuses, in the latter 42 normal and only one abnormal. This is held to support view, already maintained by several students of mice, that the homozygous yellow individuals perish *in utero*, thus accounting for the long-known abnormal ratio of two (dominant) yellows to one non-yellow, in F_2 hybrids of these animals, and the fact that the pure-dominant type is not known to occur. Little likewise offers some limited evidence that a similar prenatal mortality occurs among the homozygous embryos of "black-eyed-white" mice. F. B. Sumner.

949. LLOYD, FRANCIS E. The origination of ascidia under quasi-experimental conditions. Trans. Roy. Soc. Canada 14: 71-80. 1918.—Describes ascidia formed in cotton plants grown in small pots and subjected to alternate periods of drought and moisture. Attributes results to mechanical pressure set up in the growing buds by resistance offered to rapidly growing internal parts by indurated outer regions. Characters of incompletely ascidiote leaves consist in foldings, sinuses, conerescences, enations. These malformations are not identical with tomosis but may appear concurrently. There is no evidence for inheritance in the cotton plant except that offered by "cluster" varieties in which *entate-venae*, fasciations and concomitant behaviors are dominant.—J. Arthur Harris.

950. LEMSDEN, D. Orchid breeding. Jour. Internat. Gard. Club 2: 203-212. 8 fig. 1918.—Brief review and discussion of history of orchid breeding and of troubles involved in raising seedlings. Several hybrids upwards of 50 years old, propagated asexually, still retain their original vigor. Author is studying Mendelian inheritance and effect of close-pollination in this family. It is author's firm belief deduced from his own and experiments of others, that various root fungi are necessary to successful growth of orchids, especially seedlings. Probably case of mutual parasitism and not symbiosis. Separate organism is required for each tribe, and often for each genus and even species. Attempts are being made to obtain pure cultures of these orchid fungi. Methods and culture medium are described in detail.—Orland E. White.

951. McCLELLAND, T. B. Influence of foreign pollen on the development of vanilla fruits, Jour. Agric. Res. 16: 245-251. Pl. 31-35. 1919.

952. PEARL, RAYMOND. On the mean age at death of centenarians. Proc. Nation. Acad. Sci. [U. S. A.] 5: 83-86. 1 fig. Mar., 1919.—Purpose of this paper is to determine with accuracy where deaths at one hundred years or over should be centered in statistical computations. Interval evidence of inaccuracies found in the census data available. By use of a properly graduated mortality table, author arrives at figures 101.7 for whites and 102.0 for negroes.—Sewall Wright.

953. PRICE, J. D. Report of Director. Ann. Rept. Georgia Agric. Exp. Sta. 30-31. (1917-1918): 4-18. 1919.—Includes brief statement of breeding results in collards (*Brassica*), tomatoes (*Lycopersicon*) and grapes (*Vitis*).—G. H. Skull.

954. ROBERTSON, T. BRAILSFORD, AND L. A. RAY. Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding. Jour. Biol. Chem. 37: 377-426. 8 fig. Mar., 1919. Paper describes normal growth curve of white mice between 4 weeks of age and death from natural causes. The maximum weight was reached at 91 weeks in males, 94 weeks in females. Average duration of life was 110 weeks in males, 103 weeks in females. Close inbreeding was carefully avoided, but progressive decline in rapidity of growth, noted between 1914 and 1917, is attributed to continued breeding within one stock.—Sewall Wright.

955. SALISBURY, E. J. Variation in *Eranthis hyemalis*, *Ficaria verna*, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth. Ann. Bot. 33: 47-79. 20 fig. Jan., 1919. [See Bot. Absts. 2, Entries 703, 749.]

956. Sô, M., Y. IMAI, and Y. TERASAWA. Dalkon no hi-Mendel-sei Iden ni tuite. (On the non-Mendelian inheritance of *Raphanus sativa*.) [In Japanese.] Bot. Mag. Tôkyô 33 (No. 386, Japanese part): 21-30. Feb., 1919.—Results of culture-experiments on two red-rooted Chinese varieties of *Raphanus sativus*. Each of these varieties segregates by self-fertilization into red- and white-rooted plants, the number of latter being nearly equal to, or greater than, that of red. Extracted white plants breed true in later generations, while extracted red plants again segregate into red and white. Red plants crossed with white ones gives both kinds of plants, the number of white being almost equal to, or greater than that of red. Fertilization between two extracted white plants gives only white. Self-fertilization of flowers borne on green branches which are produced on red plant by vegetative segregation gives rise to white exclusively, while that of flowers borne on red branches of the same individual produces both kinds of progeny. When plants differing in intensities of red coloration were selfed or crossed with white ones the number of red plants segregated was, contrary to author's expectation, much greater in the case of less than in that of more intensely colored plants. Authors conclude that the inheritance here mentioned is non-Mendelian, but do not enter into theoretical discussion.—S. Ikeno.

957. STOCKARD, CHARLES B. Hereditary deficiencies in the sense of smell. Science 49: 237-239. Mar. 7, 1919.—Author criticises hypothesis of GLASER [Bot. Absts. 2, Entry

936] that "smell-blindness" (a term used by Blakeslee, unfortunate because anosmia is comparable with actual blindness rather than with color-blindness) occurring in "a young Russian Jew, a fugitive from Kiev" is hereditary. Disease, rhinoscleroma, endemic in region of Kiev, and various forms of chronic rhinitis, prevalent among Russian Jews, produce anosmia. Careful studies of environmental conditions are necessary in testing heredity of deficiencies of this sort. It is very probable, however, that defects in sense of smell are in some cases hereditary.—P. W. Whiting.

958. STOMPS, THEO. J. Vergrünung als parallele Mutation. [Virescence as a parallel mutation.] *Rec. Trav. Bot. Néerlandais* 15 (1918): 17-26. 1 table, 1 fig. 1919. In preceding paper author has mentioned occurrence of same mutation in different species of *Oenothera* and has called this phenomenon "parallel mutation." A new case of parallel mutation is here described. Several years ago de Vries observed a mutant of *Oenothera lamarckiana*, which showed virescence and same mutation was found by author in 1917 in cultures of *Oenothera biennis*. The mutant plant was quite sterile and had groups of little leaf-bearing branches instead of flowers. Apex of smallest leaves of these branches was often curled up and this is considered by author as indication that they were destined to become stamens. Some leaves were divided and branches often showed fasciation. Number of chromosomes of mutant plant proved to be 14, like that in original *Oenothera lamarckiana* and author was unable to observe disappearance of parts of chromosomes, as Delaunay had observed in sterile forms of *Muscari*. Occurrence of forked leaves and fasciated branches leads author, in opposition to de Vries and Worsdell, to consider fission of leaves not as incipient form of fasciation but as first step towards reappearance of dichotomous branching of lower plants. *Tine Tammes*.

959. STRAMPPELLI, N. Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.] *Atti R. Acad. Lincei, Rend. V. Cl. Sci. Fis., Mat. e Nat.* 27: 131-135. Fig. 1-4. 1918.

960. VAN HERWERDEN, M. A. Untersuchungen über die parthenogenetische und geschlechtliche Fortpflanzung von *Daphnia pulex*. [Researches on parthenogenetic and sexual reproduction of *Daphnia pulex*.] *Versl. Koninkl. Akad. Wet. Amsterdam*, 20: 1. 1918. The descendants of a parthenogenetic specimen of *Daphnia pulex* cultivated and pedigreed in the laboratory, from January, 1910 until December, 1917. Cultures were kept at room cave and brood-stove temperature (the water temperature of latter cultures varying between 12° and 18°C.). This cultivated stem of *Daphnia pulex* maintained, notwithstanding the altered condition of life, during these 8 years, the monocyelic characters it showed in nature. Controls have been taken during a year from the ditch where the *Daphnia* originated. While in the natural habitat only ephippial eggs survived during the winter months, in laboratory a part of the animals continued parthenogenetic method of reproduction. In this way a set of parthenogenetic generations without introduction of an ephippial egg has been cultivated from January 1910 till February 1916. It has been demonstrated that every autumn new room, cave, and brood-stove cultures commenced in the same time the sexual method of reproduction and it is notable that this simultaneous beginning of the sexual way took place in *Daphnia* with quite diverging position in the pedigree, e.g., October 26, 1915 in two cultures diverging from the general stock since the winter 1912. The gametogenesis appeared as well in the first as in the later broods, as well in isolated individuals as in mass cultures. In many ways it has been tried to influence gametogenesis artificially, as in Woltereck's cultures of *Daphnia*. A sudden cooling of eggs in their last ripening period often gave rise to males, but only in a period of lability of the sexual and asexual tendencies. Also viviparous reproduction has been observed, namely asexual differentiations of grandchildren after exposing ripening eggs of the grandmother during 24 hours. A radiation with radium or ultraviolet rays in sensible period of ovary has no influence on method of reproduction. Food changes did not affect sex in any way, nor did treatment with many different chemicals. He concludes that continuations of this rhythmic mode of reproduction continued naturally.

standing changed conditions of life in the laboratory—has been fixed in the genotype? Or must one accept autumnal influences working as well in the laboratory as in nature, but escaping observation?—The cultivated stems of *Daphnia pulex* showed no degenerations in the 8 years' culture. Temporary depressions have been restored by additions of traces of cyanhalin, manganochlorid and other substances. With yeast feeding also good results have been obtained. Variability as to the outer appearance proved to be very great in the cultivated stems of *Daphnia pulex*; but the only definite morphological change observed during these 8 years was the vanishing of the dorsal chitinous teeth which characterized during the first year of culture the greater part of the new-born *Daphnia*.—In a separate set of experiments with constant temperature it has been demonstrated that between 10° and 20°C. the embryonic development of *D. pulex* follows in broad lines the law of van't Hoff about temperature coefficients.—M. A. van Herwerden.

961. VAN HERWERDEN, M. A. Effects of the rays of radium on the oögenesis of *Daphnia pulex*. Versl. Koninkl. Akad. Wetensch. Amsterdam 21*: 1919.—Egg-cells of *Daphnia pulex* are most susceptible to radium radiations in the last stage of maturation. The resisting power increases during embryonic development. In one and same brood individual difference of susceptibility to rays of radium is frequently noted. The egg that resists deleterious influence often develops into perfectly normal animal, which becomes fertile. Rare specimens with morphological anomalies seldom become adults. Only once from such an abnormal young a stock without morphological changes has been raised. —Long-continued radiation from 0.7 milligram radium bromide does not endanger life of sexually mature *Daphnia* but only its fertility. It depends on the duration and strength of radiations whether only maturing eggs, oöcytes, or also oögonia, are injured. Large progenies being easy of observation afford an opportunity to study this in every special case. Prior to maturation *Daphnia* resists radium radiations for long time. Only after a sojourn of many hours in the capsule with 0.7 milligram of radium bromide the future ripening of the oögonia is also endangered. Microscopic examination of the ovary and embryos reveals that deleterious effect of radium manifests itself only toward close of blastula stage by abnormal behavior of the chromatin, as when the egg cells were affected when lying still in the ovary.—If the beta-rays are eliminated through filtrations, deleterious effect of radium is arrested or highly diminished, which proves beta-rays to be mainly responsible for destruction of the eggs.—M. A. van Herwerden.

962. WHITE, ORLAND E. [Review of: HARWOOD, W. S. New creations in plant life. New York, 1918.] Torreyia 19: 15-17. 1919.

963. ZIEGLER, H. E. Die Vererbungslehre in der Biologie und in der Soziologie, ein Lehrbuch der naturwissenschaftlichen Vererbungslehre und ihrer Anwendungen auf den Gebieten der Medizin, der Genealogie und der Politik, zugleich 2 Aufl. der Schrift über die Vererbungslehre in der Biologie. Zehnter (Schluss) Teil des Sammelwerkes "Natur und Staat." [Genetics in biology and sociology, a text-book of genetics and its applications in the fields of medicine, genealogy and political science, being the 2nd edition of the work on "Genetics in biology" and tenth (concluding) part of the general work "Nature and the State".] xvi+479 p., 5 partly colored pl., 114 fig. Gustav Fischer, Jena, 1918.—Author first considers chromosomes and their reduction, which he holds completely explain results of experimental genetics. Theory of human heredity must be based on general biological theory of heredity. Discusses significance of doctrine of hereditary factors for disease and malformations. Section dealing with problems of sociology and political science is new and author incorporates here pertinent conclusions from biological facts; he treats heredity of psychical traits including defects and mental disorders, natural dissimilarities of men; social inequality (social contracts, private property, natural gifts and social position, origin of social rank, the inferior, criminal); origin of family and state (zoological view, false doctrine of Rousseau, etc.); parliamentary government. [See also Bot. Absts. 2, Entry 923.]—J. P. Kelly.

HORTICULTURE

J. H. GOURLEY, *Editor*

964. BURKHOLDER, C. L. **Horticultural extension work in Indiana.** *Proc. Amer. Soc. Hort. Sci.* 15 (1918): 56-59. 1919.—An outline is given of the methods pursued in carrying on horticultural extension work in Indiana. The work consisted principally in demonstration work in orchards, orchard club work, winter short course schools, landscape work, vegetable gardening, and exhibit work.—*J. H. Gourley.*

965. CLOSE, C. P. **Extension service in pomology in the United States Department of Agriculture.** *Proc. Amer. Soc. Hort. Sci.* 15 (1918): 49-52. 1919. An outline is given of the extension work which is being carried on by the U. S. Department of Agriculture. These activities consist in extension schools and field demonstrations, which cover practically every line of pomological work.—*J. H. Gourley.*

966. DARROW, GEORGE M. **Strawberry culture: South Atlantic and Gulf Coast Regions.** U. S. Dept. Agric. Farmers Bull. 1026. P. 1-40. *Illustr.* A discussion is given of the culture of the strawberry in the South Atlantic and Gulf Coast regions. Methods are recommended for the production and marketing of the fruit.—*J. H. Gourley.*

967. DARROW, GEORGE M. **Strawberry culture: Western United States.** U. S. Dept. Agric. Farmers Bull. 1027. P. 1-29. *Illustr.*—A popular discussion is given on the standard methods of strawberry culture in the western United States.—*J. H. Gourley.*

968. DORSEY, M. J. **Hardiness in top-worked varieties of the apple.** *Proc. Amer. Soc. Hort. Sci.* 15 (1918): 38-43. 1 fig. 1919. A discussion is given of the nature of frost injury and winter injury of various fruits. The degree of browning of the wood is considered a most sensitive index of the winter injury which occurs to fruit trees. On this basis cuts were made into the limbs, three to five annular rings deep, and a classification of hardiness was made under the headings, no injury, slight brown, brown and dark brown. Such hardy varieties as Oldenburg, Wealthy and Patten Greening were slightly injured in the winter of 1916-17 and even Hibernia, which is generally recommended as a stock was slightly injured. The Tompkins King, Hubbardston, Jonathon and Delicious, judging from this test, did not prove to be sufficiently hardy for Minnesota conditions. It is noted that relatively hardy stocks did not prevent the more tender varieties from being injured. In no case was the degree of injury of a given variety widely different on two or more different stocks. The same observations were made for the succeeding winter, 1917-18 when the injury to apple trees in Minnesota was more extensive than for several years. It was concluded that many of the standard varieties of apples of the Eastern States approach the limit of their range in Minnesota. The injury to the apple is generally more severe than is indicated by the amount of killing back of the twigs; the smaller branches and limbs show less browning of the wood than does the trunk; the hardiness of the cion is independent of that of the stock; and, if the stock exerts any influence on the cion it is so slight that no protection is afforded the more tender variety, are the conclusions of the article.—*J. H. Gourley.*

969. GUNDERSON, A. J. **The pruning of winter-injured peach trees.** *Proc. Amer. Soc. Hort. Sci.* 15 (1918): 32-38. 1919.—Serious injury occurred to peach trees in southern Illinois. The appearance of the trees and conditions under which they suffered most are described. The Hale was injured more than the Ellberta when growing under similar conditions. Some experiments showed that light to moderate pruning was the most advantageous in the recovery of the tree of any practice followed in the text. Dehorning usually resulted in the death of the tree. Waxing the cut surfaces proved of no value. One pound of nitrate of soda per tree aided in recovery.—*J. H. Gourley.*

970. MACOUN, W. T. **Winter injury in Canada.** *Proc. Amer. Soc. Hort. Sci.* 15 (1918): 13-17. 1919.—There have been seven winters in the past sixty years in which serious winter

injury has occurred in the Provinces of Ontario and Quebec, viz. 1858-59, 1876-77, 1884-85, 1895-96, 1898-99, 1903-04, and 1917-18. The most severe winters in the past twenty years were those of 1903-04 and 1917-18, and in neither winter was there any root-injury noted as the ground was well protected by snow. These two winters were quite similar in degree of cold, time of greatest severity of cold and in the ground protection of snow. The season of 1917 was a short growing season which was not true, however, of 1903-04. In 1903-04 there were 306 apple trees including 164 varieties killed in the orchards of the Experimental Farm, Ottawa, while in 1917-18 there were 360 trees killed, including 200 varieties. In determining the exact time of the winter (1917-18) when the injury occurred data are offered which show that of 885 grafts made from cions cut December 5 and 6, 1917 on seedlings of Orion Crab, 559 or 63.16 per cent grew, while from 607 grafts made from cions cut February 13, 1918, 112 or 18.45 per cent grew, thus indicating the period when the wood was injured. This is in contrast with 1916-17 when 86.03 per cent of the grafts grew. Also by observing how low down on the trunks the injury occurred it appeared that the freezing took place early in the winter before a large amount of snow fell.—Injury to nursery stock was also very great. Notes were made on 300 varieties as to the degree of injury which occurred and they showed that of 11 per cent of the varieties which did not kill back at all 60 per cent were crab apple hybrids. The observation is also made that trees of the hardier varieties which were killed had borne a good crop in 1917. Data are given to establish this observation with the Wealthy.—While nearly all the domestica plums were killed or badly injured, few of the American sorts were hurt and they had a good crop in 1918. Russian pears and Morello cherries were killed or injured.—J. H. Gourley.

971. MARSHALL, ROY E. Establishing the orchard. Virginia Polytech. Inst. Ext. Bull. 41. 19 p., illust.—Popular.

972. OSKAMP, JOSEPH. Winter injury in Indiana. Proc. Amer. Soc. Hortic. Sci. 15 (1918): 25-30. 1919.—The winter of 1917-18 was the first on record that apple trees in Indiana suffered generally from low temperatures. Young trees, ranging in age from 3 to 14 years suffered most with a loss for the state of about 3 per cent, while old orchards suffered less.—Orchards in low spots suffered most, and there was a striking variation in hardiness of varieties. Baldwin, Stayman Winesap, Ben Davis, Northern Spy, York Imperial and Jonathon suffered most in about the order named. Northwestern Greening and Delicious were entirely uninjured. The nature of the previous season was cold and wet and such as to result in improper maturity of the wood, and this together with the earliness of the cold weather contributed to the cause of the severe injury. Trees which were weakened from any cause suffered most from winter injury. Peach trees were severely injured, especially the older trees. The acreage of bearing trees has been reduced about sixty per cent from this cause. Experiments were conducted in orchards which suffered from winter injury to determine the best methods of aiding their recovery. The treatments involved checks, light, moderate and heavy pruning, and dehorning, as well as fertilizer tests. The outstanding results of the pruning work were the disastrous results of heavy cutting and dehorning when the trees were dormant but, when done in full leaf the results were successful. Late moderate pruning seems to be the most desirable method of treating the injured trees.—By applying two pounds of nitrate of soda to a 6-year-old tree the growth was greater and the foliage was maintained on the trees for a longer time than on the check trees.—J. H. Gourley.

973. REES, R. W. Extension work in pomology in New York. Proc. Amer. Soc. Hortic. Sci. 15 (1918): 53-56. 1919.—The three main lines of work which received the attention of the extension specialist in horticulture in New York for the past year were pruning demonstrations, demonstration schools and conferences in regard to central packing houses.—J. H. Gourley.

974. SUTTON, F. J., AND H. R. NISWONGER. The home vegetable garden. Kentucky Agric. Coll. Ext. Circ. 67. 43 p. Illust.—A discussion is given of the development of the

home garden, dealing particularly with preparation and fertilization of soils, selection of varieties and planting distances of the crops, insect and fungous diseases affecting the crops with control measures, together with methods of practical home storage. *J. H. Gentry.*

975. WOOLSEY, C. *Strawberry culture*. Virginia Polytech. Inst. Ext. Bull. 36. 16 p. *Illustr.*—Popular.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOIT, *Editor*

976. BUGNON, P. *Sur une nouvelle méthode de coloration sélective des membranes végétales lignifiées. [A new method for selective staining of lignified tissues.]* *Compt. Rend. Acad. Sci., Paris*, 168: 62-64. 1919.—Author advocates the use of "Lactigrün" as a differential stain for lignified tissues. Excellent results were obtained through the use of saturated solutions, both aqueous and alcoholic, acidulated by means of HCl or acetic acid. Simple washing with water removes the stain from all but lignified tissues and by combining "Lactigrün" and Sudan III (alcoholic) a double-stain differentiating suberized and cutinized tissues from lignified tissues is obtained. Promising triple combinations were made using "Lactigrün," ammoniacal Gentian Violet, Sudan III, etc. The use of "Lactigrün" instead of phloroglucin allows the use of hypochlorite of soda for the removal of the cell contents. *V. H. Young.*

977. GROOM, PERCY. *The wood of Tetracentron Trochodendron, Drimys and other types.* *Ann. Bot.*, 33: 133. 1919.—A note explaining that Messrs. Bailey and Thompson had erroneously attributed to the author an expression of the view that these types are descended from a form which possessed wood vessels. *B. P. Thompson.*

978. HAYDEN, ADA. *The ecologic foliar anatomy of some plants of a prairie province in central Iowa.* *Amer. Jour. Bot.*, 6: 69-87. Pl. 2 14. 1919. A brief statement is presented of the views of previous workers as to the importance and effect of environmental conditions on the structure of the leaf. The leaves of 28 species, characteristic of various habitats, are then described as to orientation, arrangement, gross structure and histology; and their features are compared. The presence in the leaves of these prairie plants of a specialized palisade tissue, a thick-walled and trichomeless epidermis, water-storing tissue, and sometimes of trichomes, indicates their xerophytic tendency. The writer points out that it is not the presence of any of these characters alone, but rather their correlation with other features of the plant, which is of primary importance as an indication of xerophytism. *E. W. Sinnott.*

979. MACCAUGHEY, VAUGHAN. *The Pala or Mule's-Foot Fern (Marattia Douglasii Presl (Baker) in the Hawaiian Archipelago.* *Torrey* 19: 1-8. 1919. This fern is the sole representative in the Hawaiian Islands of the Marattiaceae. This order, abundant in early geologic periods, is at present represented by 6 genera and some 50 species, distributed through the tropics of both hemispheres, Hawaii forming the northernmost limit of its range. The occurrence of *Marattia Douglasii* in the Hawaiian Islands may be explained in three ways: (1) Introduced by natural means from the South Pacific; (2) Deliberately introduced by the natives as a food-plant; (3) Persisting as a survival of an earlier flora. This species is called *pala* by the Hawaiians, and is found somewhat sparingly through the humid zone of both windward and leeward slopes, between 800 and 3200 feet. The gross structure is described in detail. Campbell's study of the gametophytes is summarized. The fern does not occur in cultivation, but deserves attention. The name "mule's-foot fern" is proposed, in allusion to the enlarged leaf-base with the two thick fleshy stipules. These stipules were formerly baked and used as food, and were also used medicinally, and to make an agreeable drink. *J. C. Nelson.*

990. PAVILLARD, J. Sur la fleur femelle des *Ruscus*. [Concerning the pistillate blossom of *Ruscus*.] *Compt. Rend. Acad. Sci. Paris* 168: 113-115. Fig. 1-4. 1919.—A brief review of the literature dealing with the morphology of the ovule of *Ruscus* is followed by a short discussion of original observations on the pistillate flowers of *Ruscus aculeatus* and *Ruscus hypophyllum* var. *hypoglossum*. Ovules are shown to be anatropous, with the same general organization as is found in the lily (*Lilium*). The inner integument protrudes beyond the outer integument at the myropylar end, forming the opening of the micropyle.—In *R. aculeatus* the ovule is completely surrounded by a layer of lignified cells with scalariform thickenings, similar to that described by Treub in 1891 for *Casuarina*.—V. H. Young.

981. WILLIAMS, KATHERINE A. A botanical study of skunk-cabbage, *Symplocarpus foetidus*. *Torreyia* 19: 21-29. Pl. 1-2, fig. 1-13. 1919.—The range and dates of flowering of this species are described. The odor, which suggests fresh cabbage with a touch of mustard, varies widely, and is stronger in plants with ripe stamens. The early growth of the plant is described in detail. Attention is called to the double spathe in some plants. The color of the spathe varies from deep purplish-red to pale yellowish-green, usually mottled with purple. This variation in color does not seem to be due to age, as Reed has suggested, for out of 50 plants examined, withering and decay were not limited to the darker ones; nor does it seem to depend on water-content of the soil, as both colors occur side by side. The variation of flower-clusters in size and in number of flowers is shown by a table. Due to crowding, the parts of the flower are most often in fours instead of threes, and the flowers are almost cuboidal in shape. The stigma is three-lobed but the ovary is one-celled. Some specimens showed flowers with six stamens and six perianth-segments, others with the parts in fives, others with four stamens and six perianth-segments. The color and odor attract flies, which are useful in pollination. The process of germination is fully described. The plant probably does not produce flowers till the fourth year. The plants develop more rapidly in warm light places. The leaves show a transition toward netted-veining, especially under dry conditions. Microscopically they show raphides and other crystals. The juice is very bitter and acrid, but loses this property in boiling. The root-system is very large, the central rootstock being almost the size of a potato.—J. C. Nelson.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

982. DENIS, MARCEL. Sur quelques thalles d'*Aneura* dépourvus de chlorophylle. [Concerning certain thalli of *Aneura* devoid of chlorophyll.] *Compt. rend. Acad. Sci. Paris* 168: 64-66. Fig. 1-2. 1919.—The recent discovery of a species of *Aneura* devoid of chlorophyll in the Département of Saône-et-Loire, France, is recorded. The thalli are fleshy and generally sterile, resembling the coralloid roots of certain saprophytes. The presence of an endophytic fungus consisting of "balls" of rarely branched hyphae in the lower parts of the thalli and in the thizoids was demonstrated by means of differential stains. *Aneura pinguis*, which contains chlorophyll, also harbors an endophytic fungus but never to the extent noted in the chlorotic *Aneura*. The fungus appears to replace chlorophyll both morphologically and physiologically, reducing the thallus to a purely saprophytic condition. The two forms of *Aneura* are compared to the gametophytes of *Lycopodium*. *L. inundatum* and *L. cernuum* contain chlorophyll and may be compared with *Aneura pinguis*, while the chlorotic *Aneura* may be compared with the gametophyte of *L. Selago* or *L. Phlegmaria*. The numerous questions raised by the association of the chlorotic *Aneura* and the endophyte are not answered.—V. H. Young.

983. DIXON, H. N. "Chatubinskia" a further correction. *Bryologist* 21: 80-81. 1918.—It is shown that this name should properly be "*Chalubinskia*," since it was given in honor of Professor Chalubinskia, of Warsaw.—A. W. Evans.

984. HAYNES, CAROLINE C. Sullivant Moss Society exchange list of Hepaticae found in the United States, Canada, and Arctic America. *Bryologist* 21: 87-90. 1918.—A check list

of 438 species belonging to 96 genera. The sequence of the genera is according to the Engler and Prantl system.—A. W. Evans.

955. LORENZ, ANNIE. Notes on *Radula obconica* Sull. Bryologist 21: 56-59. Pl. 25. 1918.—The history of this endemic American species is reviewed, a full description is given, and a list of specimens (ranging from Vermont to North Carolina and westward to Arkansas) is added. Attention is called to the vegetative reproduction by means of caducous leaves, previously reported in a single Brazilian species of *Radula*. The figures illustrate clearly the general habit of the plant and its essential structural details.—A. W. Evans.

956. PEARSON, WILLIAM HENRY. The genus *Herberta* as represented in the Manchester Museum. Jour. Bot. 57: 42-44. 1919. Localities are given for the twenty species represented in the Museum; also critical notes on *H. adunca* (Dicks.) S. F. Gray, *H. H. debussiae* (Gottsche) Evans (recently separated by A. W. Evans), and a few other species.—K. M. Wiggand.

957. PENNELL, FRANCIS W. Concerning duplicate types. Torrey 19: 11-14. 1919.

958. RILSTONE, F. Cornish mosses and hepatics. Jour. Bot. 57: 2-10. 1919. Records are given from the eastern half of Vice-County 1 (West Cornwall) and from the drainage area of the Fowey and Looe Rivers in Vice-County 2 (East Cornwall). These include definite citations for most of the mosses and hepatics listed, the mosses representing 17 genera and the hepatics, 32. There are also brief notes on habitat, frequency, morphology and taxonomy (the whole is prefaced by a few paragraphs on the soil of the region, and the abundance of the bryophytic flora).—K. M. Wiggand.

959. WARNSTORF, C. Übersicht der europäischen gelapptblättrigen Arten der Gattung *Jungermannia* L. p. p. oder *Lophozia* Dum. [Synopsis of the European species with lobed leaves of the genus *Jungermannia* L. in part or *Lophozia* Dum.] Hedwigia 60: 43-81. March 15, July 10, 1918.—The author objects strongly to discarding the old generic name *Jungermannia* and advocates that it be retained for the species with lobed leaves, which many writers now refer to Dumortier's genus *Lophozia*. He discusses the European species by means of an extensive key, arranging them in the three groups *Bilobatae*, *Dicretilobatae* and *Trilobatae*. Critical remarks, mostly in the form of footnotes, are added, and a new species, *J. kerguelensis* Warnst., from the island of Kerguelen is incidentally proposed. The European species recognized are for the most part included in Müller's *Lebermoose*, but a few forms, such as *J. cylindracea* Dum. and *J. porphyroloba* Nees, are given specific rather than varietal rank, and a few changes in specific names are advocated.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. OLIVE, Editor

960. ATKINSON, GEO F. Relationships within the Rhodosporeae. Bot. Gaz. 67: 266-267. 1919.—Two distinct phyletic lines are recognized among the rosy-spored Agaries, distinguished in part by the presence of numerous internal cystidia in the lamellae of group one (*Pluteus* and *Clavaria*), and by their absence in group two (*Eutolma*, *Lepiota*, *Chilodactylus*, *Berula*, *Sclerocia*, and *Claudopus*).—E. W. Olive.

961. BURNHAM, STEWART H. Charles Horton Peck. Mycologia 11: 33-39. Fig. 1. 1919.

962. COLLEY, REGINALD H. Parasitism, morphology and cytology of *Conarctium ribicola*. Jour. Agric. Res. 15: 619-639. Pl. 48-59. 1918.—The paper deals particularly with the minute histology of the organism in all stages of its life history, and with the cytological phenomena exhibited in spore production in the various types of sori. The development and morphology of the pyrenium, aecium, uredinium and telium are outlined in considerable detail, the ontogeny of peridia and spore chains being carefully followed. The relation of the

fungus to its hosts is discussed, and special attention is directed to the haustoria. These structures are abundant, and the most important elements of the mycelium from the diagnostic standpoint. Each haustorium is enclosed in a definite sheath which is thicker at the tip and base than at its sides. A theoretical explanation of this condition is advanced. The nuclear history of the species is traced throughout all stages, and agrees in the main with that described for other rust fungi. Multicellular fusions at the base of the aecium are, however, of common occurrence. Since the number of polynucleate aeciospores is relatively small it is concluded that either the supernumerary nuclei in the basal cell degenerate or the basal cell gives rise to more than one chain of binucleate spores. Nuclear division is shown to be a true mitosis, and the haploid number of chromosomes is regarded as probably eight. The first division in the promycelium differs in appearance from other divisions in the life history and is regarded as the heterotypic mitosis.—Certain interesting abnormalities were observed. Aecia with reversed polarity having the chains of spores growing outward have been seen. Aecia have also been observed on the roots under several inches of bogmud. Double pycnia layers are not uncommon. Internal uredinia and telia also occur. All these phenomena are regarded as teratological.—The author describes in considerable detail the methods used by him in the investigation. In the preparation of minute objects such as aeciospores and telial horns for sectioning he found the use of a centrifuge advantageous. A method for imbedding such material in paraffin while in the centrifuge is described.—The paper is extensively illustrated with drawings and photomicrographs.—H. M. Fitzpatrick.

993. DENIS, MARCEL. Sur quelques thalles d'*Anéura* dépourvus de chlorophylle. Concerning certain thallus of *Anéura* devoid of chlorophyll. [Compt. Rend. Acad. Sci. Paris 188: 64-66. Fig. 1-2. 1919.—See Bot. Abstr. 2, Entry 982.]

994. [DODGE, B. O.] ANONYMOUS. Index to American mycological literature. Mycol. 2, 11: 47-50. 1919.

995. DRECHSLER, CHARLES. Morphology of the genus *Actinomyces*. I. Bot. 66: 67-68, 83. Same title. II. *Ibid.* 67: 147-168. Pl. 2-9. 1919.—Of the probably more than 100 species examined by the author, he selects 18 for critical study of cultural and morphological characteristics. These 18 are designated by Arabic numerals and four of them are referred to previously described species, *Actinomyces XVII* being the potato scab organism (*A. scabiei* (Thaxter) Güssow). Notwithstanding the minuteness of the filaments of *Actinomyces* (the diameter ranging commonly from 0.5-1.2 μ), which has been apparently primarily responsible for its inclusion by most recent writers among the bacteria, the author regards the characters (the production of aerial spores, abundant branching, the appearance of vacuoles in the protoplasm, the presence of granules in the spores of many species which possess the staining properties of nuclei) as fungoid, and hence would place *Actinomyces* among the Hyphomycetes, as a mucedinous group with tendencies toward an Isarioid habit. Sporogenesis begins at the tips of the fertile branches and proceeds basipetally. The sporogenous hyphae of most species are coiled in peculiar spirals, which exhibit pronounced specific characteristics in the number, diameter, and obliquity of their turns, and especially in the direction of rotation. 11 species having sinistorse branches, 5 dextorse, 1 uncertain. Two tendencies in the development of the spore-bearing fructifications are recognizable (the majority of species also show intermediate tendencies): one, an erect dendroidal type, in which the sequence of sporogenesis is successive; the other, leading to a prostrate, racemose tree in which sporogenesis is more nearly simultaneous. The plants were grown usually on potato or glucose agar. For permanent preparations, some of the agar bearing the fungus was cut off and applied firmly to slides smeared with albumen fixative, then carefully removed so as to transfer the mycelium from the agar surface to the slide; followed by fixation, staining (preferably with Delafield's haematoxylin), and mounting in balsam. [See Bot. Abstr. 2, Entry 58].—E. W. Olive.

996. DURAND, ELIAS J. *Peziza proteana* var. *sparassoides* in America. Mycologia 11: 1-3. Pl. 1. 1919.—This variety is described and contrasted with *Peziza proteana*; the char-

differences noted are the larger size, greater complexity of masses and extreme brittleness of the flesh. The author believes this to be the same as *Gyromitra Philippii* Mass. —H. R. Rosen.

997. FROMME, F. D., AND T. J. MURRAY. Angular leaf spot of tobacco, an undescribed bacterial disease. Jour. Agric. Res. 16: 219-228. Pl. 25-27. 1919. See Bot. Absts. 2, Entry 1035.

998. HEMMI, TAKEWO. Vorläufige mitteilung über eine neue anthraknose von *Evonymus japonica*. [A new anthracnose of *E. japonica*.] Ann. Phytopath. Soc. Japan 1: 9-15. 1918. See Bot. Absts. 2, Entry 1049.

999. LEVINE, MICHAEL. The sporadic appearance of non-edible mushrooms in cultures of *Agaricus campestris*. Bull. Torrey Bot. Club 46: 57-63. Pl. 1-5. 1919. Visits to the beds of many commercial mushroom growers made possible a study of various non-edible forms which appeared. Those discussed are: *Panazolus tenuosporus* Murrill, *P. campanulatus* L., *P. retrugis* Fr., *Clitocybe dealbata* Sow., *Tricholoma melaleucum* (Fr.) Pez., *Peziza domithiana* Cooke.—P. A. Munz.

1000. LISTER, G. Two new varieties of *Lamproderma*. Jour. Bot. 57: 25-27. Pl. 552. 1919. —*L. violaceum* (Fries) Rost., var. *debile* G. Lister and Howard, and *L. atropurpureum* Meylan, var. *anglicum* G. Lister and Howard described as new; both obtained by H. J. Howard in Whittingham Woods near Norwich, England. Curious crystalline, rod-like structures, scattered over the sporangia of the former species, are discussed. —K. H. Wiegand.

1001. McDONOUGH, W. B. Development of *Stropharia epimyces*. Bot. Gaz. 67: 258-263. Fig. 1-19. 1919.—This mushroom, parasitic on *Coprinus*, follows in its mode of development that described for the group including *Agaricus campestris* and other forms, in which the hymenophore primordium appears first, pileus and stem being differentiated later. *Stropharia* and *Agaricus* are therefore closely related genera. [See Bot. Absts. 2, Entry 730.] —E. W. Olive.

1002. MURRILL, WILLIAM A. Cuban polypores and agarics. Mycologia 11: 22-32. 1919. A list of 151 recognizable and 5 doubtful species of Polyporaceae and 192 recognizable and 4 doubtful species of Agaricaceae, together with the substrata or hosts, is presented. —H. R. Rosen.

1003. ANONYMOUS. [Murrill, W. A.] [Rev. of: Burt, E. A. *Merulius in North America*. Ann. Missouri Bot. Gard. 4: 305-362. Pl. 29-22, fig. 1-19. 1907.] Mycologia 11: 45-46. 1919.—Reviewer commends Dr. Burt's article and presents Dr. Murrill's field notes on *Merulius hirsutus*. —H. R. Rosen.

1004. PARKS, H. E. Notes on California fungi. Mycologia 11: 10-21. 1919. Field data, especially habitat, on various Hymenomycetales and hypogaeous fungi are presented. Some of these are believed to be new species. —H. R. Rosen.

1005. PAULSON, ROBERT. [Review of: SMITH, ANNIE LORRAIN. A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I. 2nd ed. 519 p., 71 pl., 11 fig. Printed by the Museum. 1918.] Jour. Bot. 57: 21-23. 1919.

1006. PENNELL, FRANCIS W. Concerning duplicate types. Torrey 19: 13-11. 1919.

1007. SAUNDERS, JAMES. The Mycetozoa of Bedfordshire. Jour. Bot. 57: 63-65. 1919. —A list of the species found, with localities and some habitats. —K. M. Wiegand.

1008. SMITH, ANNIE LORRAIN. A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I. 2nd ed. 519 p., 71 pl., 11 fig. Printed by the Museum. 1918.—Rev. by R. Paulson in: Jour. Bot. 57: 21-23. 1919.

1009. STARKMAN, E. C., AND M. N. LEVINE. Effect of certain ecological factors on the morphology of the urediniospores of *Puccinia graminis*. Jour. Agric. Res. 16: 43-47. 1919. See Bot. Absts. 2, Entry 1051.

1010. STEVENS, F. L., AND NORA E. DALBEY. New or noteworthy Porto Rican fungi. Mycologia 11: 4-9. Pl. 2-3. 1919. Two new genera, *Septoriopsis* and *Wageria*, are described with *S. Chamaesyceae* and *W. portoricensis* as the type species, the former genus belonging to the Tuberculariaceae-Scolecosporeae and the latter to Perisporiaceae-Phoma didymae. The following seven other new species are described: *Septoriopsis Piperis*, *Erysiporium Leucaecae*, *Ramularia Mimosa*, *Haplographium portoricensis*, *Microclava Cacti lobiae*, *Mycosphaerella subuloma*, *Stephanoma Melioliac*.—H. R. Rosen.

1011. VINCENS, F. Quelques maladies des plantes cultivées au Pará (Brésil). [Some diseases of the cultivated plants of Para, Brazil.] Bull. Soc. Path. Veg. France 5: 45-55. Pl. 1-5. 1918. See Bot. Absts. 2, Entry 1093.

1012. WILLIAMS, R. S. Notes on some western lichens. Bull. Torrey Bot. Club 46: 21-25. 1919. A report is made on a collection of lichens made in the Yukon region in 1888 and 1899, and on one made in Montana in 1897. Various species are listed and corrected, made of the reports published by others on the same material.—P. A. Munz.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

1013. MACCAGHEY, VAUGHAN. The pala or mule's-foot fern (*Marattia Douglasii* [Prell] Baker) in the Hawaiian Archipelago. Torrey 19: 1-8. 1919.—See Bot. Absts. 2, Entry 976.

1014. SCOTT, D. H. On the fertile shoots of *Mesoxylon* and on the allied genus. Ann. Bot. 33: 1-21. Pl. 1-3, fig. 1-3. 1919.

PATHOLOGY

DONALD REDDICK, *Editor*

1015. ÅKERMAN, Å. Iakttagelser rörande stråfusariose på vårvete sommaren 1917. [Specific resistance of different varieties of spring wheat to *Fusarium culmorum*.] Sveriges Urdesf. Tidskr. 28: 82-89. 1918. Spring wheat in southern and central Sweden suffered severely in 1917 from attacks by *Fusarium culmorum*. This was due to (1) infested seed developed in the damp, rainy weather of the preceding harvest and (2) the great drought in the spring of 1917 which weakened the seedlings and made them more susceptible. Nine varieties are named, by number, which possessed immunity or resistance and 5 which were especially susceptible.—Differences in susceptibility were confirmed by numerous controlled experiments. The cause of the difference is not known, but there is no relation between earliness of maturity and susceptibility. Possibly it is due to the structure of the flower or the presence of substances toxic to *Fusarium*. [From abst. in: Internat. Rev. Sci. and Pract. Agric. 9: Entry 1297. 1918.]—D. Reddick.

1016. ANONYMOUS. Wart disease of potatoes. Repts Bd. Agric. Scotland (1917) 6: lxv-lxii. 1918.—Polato warl (*Chrysophlyctis*) was reported from twice as many gardens and farms as in 1916. Use of poor planting stock, and use of infested land, under the war stimulus, are thought to account for this; also the variety Arran Chief, a very susceptible variety, was planted extensively.—According to law, license must be secured before infested land may be planted to potatoes and only resistant varieties may be used. A list of such varieties is mentioned.—D. Reddick.

1017. ANONYMOUS. American gooseberry mildew. Rept. Bd. Agric. Scotland (1917) 6: lxii. 1918.—"The practice of dipping bushes in a solution of lime-sulfur solution before

despatch to customers, which the Board recommended last year to occupiers of infected nurseries, has been found to be very efficacious in preventing the spread of the disease from these premises."

1018. ARNAUD, G. Le mildou des lilas et la maladie des cotylédons d'érable. [The lilac mildew and a disease of maple cotyledons.] Bull. Soc. Path. Veg. France 5: 58 (2). 1918. *Phytophthora syringae* is reported as occurring at the Pathological station in Paris. *Botrytis cinerea*, *Heterosporium syringae*, *Cladosporium halbarum* and *Dothidea pallidula* are also reported on the same host. *Cercospora acerina* attacks cotyledons of *Acer sp.* causing brown spots and final decay. —C. L. Shear.

1019. AVERNA SACCÁ, ROSARIO. Exame microscópico das jaboticabas enviadas pela directoria de agricultura. Ferrugem das jaboticabeiras. [Rust of jaboticaba.] Bol. Agric. São Paulo 19: 68-69. 1918. —*Uredo* sp. found on leaves of jaboticaba [*Miconia jaboti* (Lam.)]. One or two treatments with bordeaux mixture should give control. Cultural practices that will aid in control are good air drainage and fertilization with phosphate to increase vigor of host. —D. Reddick.

1020. AVERNA SACCÁ, ROSARIO. Molestia das viderias. [Diseases of grapes.] Bol. Agric. São Paulo 19: 214-220. 3 figs. 1918. —Anthracnose caused by *Gliosporium ampelophagum*, occurs destructively on *Vitis rupestris* (L.) Mill. *V. rupestris palata* and on the varieties Seibel and Niagara. —Another kind of anthracnose appeared on Niagara in 1918 caused by *Gl. physalosporae*. Sulfate of iron treatment is recommended. —D. Reddick.

1021. AVERNA SACCÁ, R. Molestias encontradas sobre as folhas de fumo e de gergelim provenientes de Socorro (Pernambuco) remetidas pela directoria de agricultura. [Foliage diseases of tobacco and gergelim.] Bol. Agric. São Paulo 18: 981-986. 1917. [Reprinted Bol. Agric. São Paulo 19: 70-71. 1918.] Tobacco leaves from Pernambuco were found affected with *Cercospora solanacearum*. The numerous spots on the leaves rendered them nearly worthless. The disease appears in damp, shady places. Various species and varieties differ in their susceptibility. Since fungicides would injure the quality of the tobacco it is recommended that resistant varieties be used and that the plantation be arranged with reference to suitable air drainage. —A leafspot of *Sesamum indicum* (Gergelim) was found in which a species of *Cercospora* occurred. [From abst. in: Internat. Rev. Sci. Plant. Agric. 9, Entry 1058. 1918.] —D. Reddick.

1022. BELGRAVE, W. N. C. Experiments on the prevention of brown bast. Agric. Bull. Fed. Malay States 6: 187. 1918. —Experimental soil treatments for the control of "brown bast" [of rubber (?)] are suggested. —J. Rosenbaum.

1023. BELGRAVE, W. N. C., AND F. W. SOUTH. Field notes and observations on brown bast. Agric. Bull. Fed. Malay States 6: 181-186. 1918. —An unknown disease of rubber trees found in the Malay States and Sumatra is described. Partial remedies are suggested. J. Rosenbaum.

1024. BOIS, D. Sur deux maladies des pommes: Water-core (Pommes vitreuses), Bitter Pit (Taches amères). [Two diseases of apples, water-core and bitter pit.] Bull. Soc. Path. Veg. France 5: 34-41. 1918. —The author mentions the occurrence of these two diseases in France and gives a brief summary of the results of the principal investigations which have been made by previous writers, with citations of the most important papers published. —C. L. Shear.

1025. BROOKS, CHARLES, J. C. COOLEY, AND D. E. FISHER. Apple scald. Jour. Agric. Res. 16: 195-217. 11 figs. 1919. —See Bol. Abstr. 2, Entry 1143.

1026. BURNHAM, STEWART H. Charles Horton Peck. Mycologia 11: 32-33. Fig. 1. 1919.

1027. BUTLER, E. J. **Immunity and disease in plants.** Agric. Jour. India (Special Indian Science Congress Number) p. 10-28. 1918.—It is necessary to distinguish between the avoidance of disease, the endurance of disease, and true immunity or resistance to disease. Several instances are given of the ways in which plants may avoid a disease to which they are not in any way truly resistant. They may be grown in areas with conditions of climate which the parasite cannot stand, it being shown that many of our most important cultivated plants have a wider range than their parasites. Or the date of sowing may be altered to a period when the temperature or humidity is unsuitable for the germination of the spores of the parasite. Or varieties may be grown which mature quickly, before the parasite can do them much damage. Cases are given of successful endurance of the attacks of a plant parasite. These are mostly connected with the vigour of the plant, and can be modified by different methods of cultivation and manuring.—True resistance to disease differs from the above in depending on some structural or physiological characters of the plant which prevent successful invasion by the parasite. The structural characters of importance in specific cases are detailed and examples given. The physiological characters which influence immunity are more difficult to define, but are undoubtedly the most important class of factors in the majority of cases. They are connected with the nature of the cell contents, not with the characters of the walls or other structural peculiarities. Sometimes the living part of the contents—the protoplasm—is chiefly involved; sometimes the non-living part—usually substances dissolved in the cell sap—is more important. Amongst these substances, tannin and organic acids are shown to occupy a prominent place.—The relative resistance to specific diseases of different varieties of plants is discussed, and indications given of the physiological characters most probably concerned.—The external conditions which modify physiological resistance are chiefly climatic and nutritional. Resistance in one locality does not necessarily imply resistance to the same disease in another locality. Soil is often important, the influence of calcareous soils being particularly evident in several diseases. Nutrition often has a strong influence on disease and there is a very wide field for further research in this direction. It is shown that all three of the more important plant foods obtained through the roots—nitrogen, phosphorus, and potassium—may, according as they are present in excess or are deficient, have a marked influence on susceptibility to disease. How they act is not known and attention is drawn to this problem as one on which Agricultural Chemists might throw much light if they could show how specific fertilizers influence the chemical composition of the plant cell.—Wm. McCrae.

1028. CAPUS, J., and J. FEYTOUD. **Note sur une maladie du noyer.** [Note on a disease of the walnut.] Bull. Soc. Path. Veg. France 5: 61-63. 1918.—The disease occurs on the cultivated walnut about Terrasson, France. Affected plants show yellowing of the leaves, the tips of the branches die, and in a few years the trees are dead. A fungus, believed to be *Armillaria mellea*, is found on the roots. This has been considered the cause of the disease.—C. L. Shear.

1029. CARRNER, EUBANKS. **Angular leafspot of cucumber: dissemination, overwintering and control.** Jour. Agric. Res. 15: 201-220. Pl. 13-16. 1918.—*Bacterium lacrymans* on *Cucumis sativus* causes angular spots on leaves and circular, water-soaked spots on fruits. The disease is widely distributed and the losses from it places it among the diseases of major importance for cucumbers.—Infection on leaf and fruit is by way of stomates. Inoculations made at different hours show that infection occurs chiefly during the day rather than at night, and this is probably correlated with stomatal movement.—The organism is disseminated chiefly by rain, but pickers and probably insects play a part in the process. It is readily killed in artificial media by freezing, and by heat at 50° for 10 minutes. It is readily killed by the common germicides. The bacteria are sensitive to desiccation but have been found to persist for 7 months on seed and it is thought that this is the common method of overwintering.—No resistant varieties have been found. Sanitary measures with reference to picking may prove helpful in control but seed treatment offers the greatest hope of economical control of the disease.—D. Reddick.

1030. COLLEY, REGINALD H. Parasitism, morphology and cytology of *Cronartium ribicola*. Jour. Agric. Res. 15: 619-659. Pl. 48-59. 1918. See Bot. Abst. 2, Entry 992.

1031. DAVIS, W. H. Chlorotic corn (A progress report). Proc. Iowa Acad. Sci. 24 (1917): 359-460. 1918.—Chlorotic corn plantlets have been noticed for a number of years. Numerous infection experiments with sap from sick plants of the supposed organism were made, but the results were negative. The roots appeared normal while the chlorotic leaves die. One case was noted where new leaves seemed to contract the disease. Seemingly warranted conclusions are that the embryos of corn may be chlorotic. Chlorosis may not be transferred by contact or sap. When plantlets are entirely chlorotic they will not mature. I. E. Melhus.

1032. DENIS, MARCEL. Sur quelques thalles d'*Aneura* dépourvus de chlorophylle. [Concerning certain thallus of *Aneura* devoid of chlorophyll.] Compt. Rend. Acad. Sci. Paris 168: 64-66. Fig. 1-2. 1919.—See Bot. Absts. 2, Entry 982.

1033. DUFRÉNOY, J. Les réactifs histologiques de l'espèce et la spécificité parasitaire. [Biological tests of species and parasitic specificity.] Rev. Gén. Sci. 30: 11-17. 1919.—Review of recent literature on biological species, especially that of Stakman and co-workers. [See Bot. Absts. 3, Entry 822.]—D. Reddick.

1034. DUFRÉNOY, JEAN. The biological significance of false witches'-brooms in *Erica*-ceous plants. Jour. Washington Acad. Sci. 8: 527-532. 1918. Witches'-brooms showing infection with *Exobasidium undonis* Maire, *Gloeosporium conica* Maire and *G. myrtilloides* n. sp. occur on *Arbutus unedo*.—Regarding the assumption that mycelia growing in the vascular tissue hinder the ascent of water and result in partial starvation of the leaves, the author states that the vessels are never obstructed by the fungi mentioned. Infected leaves are rolled up and present less surface to transpiration. They also contain red coloring matter which might cause modification of transpiration. Experiments indicated that the leaves of the diseased shoots show greater transpiration than normal leaves. This is regarded as due to the diseased leaves remaining juvenile while the sound leaves become thickly cuticulated. Insoluble carbohydrates were scarce in the diseased tissues. Glucosides were found in the sound tissues but were lacking in those infected with *Gloeosporium*. As the false witches'-brooms possess very low if not fully inhibited power of assimilation and are shorter lived than healthy shoots, they cannot be interpreted as symbiotic organisms as suggested by Vuillemin.—C. L. Shear.

1035. FROMME, F. D., AND T. J. MURRAY. Angular leaf spot of tobacco, an undescribed bacterial disease. Jour. Agric. Res. 16: 219-228. Pl. 25-27. 1919.—An epiphytotic occurred in the tobacco (*Nicotiana tabacum*) fields of Virginia in 1917. This was a season of heavy rainfall and subnormal temperature. In many fields every plant was affected and fully half the crop rendered unfit for harvest. Vigorous plants invariably were more affected than weak ones.—Lesions occur only on the leaves and are most abundant on the top and middle leaves. The spots are angular and may reach 8 mm. in diameter. As many as 500 spots may be found on a heavily infected plant. Bacteria were isolated readily and inoculations made on plants in the greenhouse, with the atomizer, by smears, or by needle pricks, were successful. Vigorous plants showed the most lesions and the incubation period was shortest (4 days) in them. Average incubation period 7 days.—The organism does not seem to have been previously described and the name *Bacterium angularum* is proposed for it. Cultural characters are stated briefly. Group number 211.232033.—D. Reddick.

1036. GABOTTO, L. La peronospora del mais. [Mildew of maize.] Il Coltivatore 64: 331-333. 3 fig. 1918.—Plants attacked by *Sclerospora macrospora* presented not only a weakly appearance but had virescent male flowers and no ears. [From abstr. in: Internat. Rev. Sci. and Pract. Agric. 9, Entry 1053. 1918.]—D. Reddick.

1037. GARDNER, M. W. Anthracnose of cucurbits. U. S. Dept. Agric. Bull. 727. 68 p., 15 fig. 1918.—A monographic treatment of the disease in all places. The work of others to date is brought together and from observation and experiment numerous contributions are

made. —The life history of the fungus, *Colletotrichum lagenarium*, has been studied minutely and important stages are illustrated. The nutrition of the fungus is reported in some detail. The fungus has been found in soil under diseased plants and in surface drainage after rains. Evidence is presented that the fungus overwinters in the field and that it may be carried on the seed. Spraying does not afford an effective control. [See Bot. Absts. 1, Entry 1666.] —H. W. Dye.

1038. GIDDINGS, N. J. Infection and immunity in apple rust. West Virginia Agric. Exp. Sta. Tech. Bull. 170: 71 p., 11 pl. 1918.—A brief summary of previous work on *Gymnosporangium juniperi-virginianae* and the disease it produces, is given. The exact dates on which apple leaves became infected were determined. A number of leaves were exposed to and the same number protected from infection each day. A careful record of the development of the rust galls on the cedar, of meteorological conditions and of the development of apple foliage was kept. It was found that an abundant discharge of sporidia was not necessarily followed by a serious rust outbreak, since there might be a lack of sufficient air movement for their wide dispersal or unfavorable temperature or humidity conditions might prevent infection. The optimum temperature for infection is thought to be about 65° F. Few sporidia were discharged at 50° F. A study of leaf growth as related to susceptibility showed that those apple leaves which grew after being inoculated usually became infected while leaves which made no further growth were for the most part immune. A list of the varieties of apples susceptible to rust, is given. There seems to be considerable individual variation in the resistance of apple trees of the same variety. This difference is also shown by cedar trees as indicated by the fact that one tree may bear a large number of galls, while another tree of the same kind standing close beside it may have few or no galls. Data presented show that the greatest injury to apples is due to the loss of foliage with consequent loss of vitality. A distinct correlation was found between the number of rust spots on the leaves and the rate of leaf fall. —It was found that apple rust could be controlled by the common spray mixtures, if applied within a day or two before the infection period. The removal of the red cedar trees, however, seems to be the only practical method of controlling this disease in commercial apple orchards. —J. L. Weimer.

1039. GUELLOCHON, L. Une maladie cryptogamique du fruit de la tomate. [A fungous disease of tomato fruit.] Bull. Soc. Hortie. Tunis 16: 131-133. 1918.—A fungous disease of tomatoes has been noted in different gardens which is attributed to *Phoma destructiva*. Various insects were found to be responsible for the spread of the disease. —J. Rosenbaum.

1040. HEMMI, TAKEWO. Vorläufige mittheilung über eine neue anthraknose von *Evonymus japonica*. [A new anthracnose of *E. japonica*.] Ann. Phytopath. Soc. Japan 1: 9-15. 1918. —A fungus described as *Gloeosporium evonymicolum* Hemmi, n. sp. causes spots on the leaves of the host, which gradually die and fall. Inoculation experiments show that the fungus is able to penetrate the uninjured epidermis of leaves of *Evonymus japonica* and of *E. radicans*. —H. A. Edson.

1041. HENNING, ERNST. Anteckningar om s. k. Slidsjukan med anledning av dess uppträdande å vete 1915 och 1918. [Notes on the so-called sheath disease with reference to its occurrence on wheat in 1915 and 1918.] K. Landth. Akad. Handl. och Tidschr. 57: 418-426. Fig. 1-3. 1918. —The sheath disease of wheat is a physiological disease and may be caused by climatic conditions, soil conditions, and insects. The dry weather, strong wind, and heavy frosts in Sweden during the summer of 1915 and 1918 were responsible for heavy losses, especially in northern, eastern, and southern sections. Unfavorable soil conditions, such as poor fertilizing, light sandy soils, badly washed soils, soils that favor drouth, etc., favor the development of the disease. —The plants may become diseased at different stages of its growth. Usually, however, the disease begins the latter part of May and reaches its highest development by midsummer (June 24), the plants becoming stunted and finally ceasing growth. The upper leaves, sheaths, and parts of the culms become yellow or gray-violet, and the upper leaves are often spiral. The culms are normal below, shrunken above, the heads poorly filled, and the kernel shrunken and dried up, and finally the leaves, sheaths, and

heads are covered with saprophytic mold. New shoots often grow from the base of stunted plants.—Recommendations for control: Good soil conditions, early varieties of wheat, not too early planting, and rotation with rye. —J. I. Lauritzen.

1042. IFORI, S., AND C. BOKURA. Soy bean cake as a substitute for peptone in the preparation of the nutrient media. Ann. Phytopath. Soc. Japan 1: 27-30. 1918.—Soy bean cake, largely imported from China as a nitrogenous fertilizer, has been found a satisfactory substitute for peptone in media for general use as well as for the cultivation of such animal pathogens as the mouse typhus bacterium. Extract from 30 grams replace 20 grams of peptone. From the analysis it appears that the chief nourishing component is crude protein (casein). This is precipitated by acid, and soy bean cake is not suited for the preparation of acid media. Sodium carbonate is used to give an alkaline reaction in preparing bouillon. [See Bot. Absts. 2, Entry 316.]—H. A. Edison.

1043. HUBERT, ERNEST E. Fungi as contributory causes of windfall in the Northwest. Jour. Forestry 16: 696-714. 1918.—The force of the wind is classified as the primary cause of windfalls, and all other causes, such as cutting operations, fungi, soil, fire, snow, height of trees, size of crowns, exposure, etc., are classed as secondary causes. Cutting operations and soil conditions take first place in importance as causing windfall damage, fungi second, exposure third.—Fungi as secondary causes play an important part in causing windfall. A large amount of damage to National Forests and the remaining forest region as well, reckoned upon a financial basis, is annually sustained through windfall; a considerable portion of this loss can be traced to fungous action alone. Fungous attack is largely responsible for windthrow in western white pine, one of the most important timber trees. It is also a menace through windthrow to all stands of infected timber left as thinned stands or as seed trees after cutting operations.—The principal fungi concerned in causing windfall are *Polygus schweinitzii*, *Trametes pini*, *Echinodontium tinctorum*, *Fomes annuus*, *Acutularia mellea*, and *Sparassia radicata*.—Recommendations are made that all trees marked to be reserved in selection cuttings or as seed trees upon a cutover area are to be free from root, butt and trunk rots. A bibliography of 26 titles is appended. Ernest E. Hubert.

1044. JOHNSTON, JOHN R., AND STEPHEN C. BRUNER. Enfermedades del naranjo y otras plantas cítricas. [Diseases of the orange and other citrus plants.] Bol. Estac. Exp. Agron. Cuba 38: 1-54. 15 pl. 1918. All of the diseases affecting citrus plants known to occur in Cuba are considered, together with the injuries due to the rust mite and to red spiders but, as the authors point out, considerable data are still lacking and several years of uninterrupted investigation will be necessary before the cause and means of controlling several of the more important diseases can be determined. The following troubles are treated in this report: fruit-rot, dieback, and gummosis due to *Diplodia natalensis*; anthracnose and witherip (*Colletotrichum gloeosporioides*); witherip of limes due to *Gloeosporium limeticum*; scab (*Cladosporium citri*); fruit rots due to *Penicillium italicum* and *P. digitatum*; blossom and rots attributed to *Alternaria citri* and *Colletotrichum gloeosporioides*; end rot of Persian limes (cause not determined); citrus knot (*Sphaeropsis tumefaciens*); rust mite (*Eriophyes oleivorus*); red spiders (*Tetranychus bimaculatus*, *T. mutilans*, *T. urticae*, *T. californicus*, and *Tarsonemus latus*); foot-rot, evidently due in part to *Phytophthora terrestris*?; gummosis; psorosis; Ceballos "scab" disease (cause unknown); black melanose or greasy spot; melanose (*Phoma citri*)—not known to occur in Cuba; chlorosis and mottled leaf; spots on leaves, fruit and twigs due to the alga *Cephaleuros*; damping-off (*Rhizoctonia* and *Sclerotium*); sooty mold (*Capnodium citri*); citrus canker (*Pseudomonas citri*) not known to occur in Cuba; and various troubles of minor importance in Cuba including "buckskin," "blight," round spots on fruit, fruit gummosis, and lichens.—S. C. Bruner.

1045. KROUT, W. S. Report on diseases of celery. New Jersey Agric. Exp. Sta. Rept. 1916: 584-603. 1918.—Experiments in treatment of seed beds and in the control of rots and also field spraying experiments for the control of *Cercospora apii* and *Sclerotia petroselinii* var. *apii*. The soil organisms were controlled in the seed beds by the use of formaldehyde.

Soil sterilization in the field by the use of steam was successful and some chemicals proved to be slightly germicidal in the treatment of soil. Bordeaux mixture was the most satisfactory treatment for the control of the early and late blight.—*M. T. Cook.*

1046. KUNKEL, L. O. A method of obtaining abundant sporulation in cultures of *Macrosporium solani* E. & M. *Mem. Brooklyn Bot. Gard.* 1: 306-312. 4 fig. 1918.—Undisturbed cultures rarely produce spores but if the mycelium is wounded, when the culture is 2 or 3 days old, abundant sporulation is induced. The wounding may be accomplished by scraping the surface of a culture with a scalpel or even with a strong platinum needle. The more thoroughly the scraping is done the greater will be the quantity of spores produced.—Spores in chains of two are rarely observed in cultures which are fruiting vigorously.—Study of *M. solani*, *M. tomato* and *M. daturae* in pure culture shows many differences especially in the morphology of spores and they are believed to be distinct species.—*D. Reddick.*

1047. LIES, A. H. "Reversion" and resistance to "big bud" in black currants. *Ann. Appl. Biol.* 5: 11-27. Pl. 3-6. 1918.—"Reversion" is characterized by one or more of the following characters: the fruit "runs off," i.e., at picking time either there are no berries left or only a few undersized fruits remain; there is an extensive growth of laterals resulting in a crowded, instead of an open form of bush (one of the most characteristic signs of a reverted bush); the internodes are long and thin; the leaf is sharp pointed and abnormally narrow. Author observes that "reversion" occurs most frequently amongst mite attacked bushes. In cases where numerous mites make an attack, the result is a condition known to growers as "oak leaf," and is a certain sign of a mite infested terminal. This condition is followed by a forcing of some of the lower lateral buds. Mite resistance was observed in Seabrook's Black, and its resistance is accounted for through its high susceptibility; the mite kills the growing point in an attacked bud and as a result cuts off the food supply and thus starves itself. [See Bot. Abstrs. 2, Entry 322.]—*L. R. Hessler.*

1048. LEMEE, E. Balai de sorcière sur *Pyrus communis*. [Witches'-broom on *Pyrus communis*.] *Bull. Soc. Path. Vég. France* 5: 32-33. 1918.—Witches'-brooms found on pear trees in France are described. They are supposed to be caused by an undetermined fungus, the mycelium of which was found in the diseased parts.—*C. L. Shear.*

1049. LIND, J., AND F. K. RAVN. Forsøg med midler mod byggets stribesygge. [Disinfection of seed against *Pleospora graminea*, injurious to barley.] *Tids. Planteavl* 25: 56-116. 1918.—Extensive investigations have been made to determine the best method of disinfecting seed barley against *Pleospora graminea*.—If proper precautions are observed good results are secured by treating the seed in one of the following solutions: (1) Soak 6 hours in 0.2 per cent formaldehyde solution; (2) or 4 hours in 0.5 per cent copper sulfate solution; (3) or 2 hours in 0.1 per cent mercuric chlorid solution. If seed is not badly affected the time of soaking may be reduced one half.—Various hot water treatments were tried and while fairly effective none was so good as any of the 3 above-named solutions.—Early sowing in cold soil favors the development of the disease.—[From abstr. in: *Internat. Rev. Sci. Pract. Agric.* 9, Entry 1302. 1918.]—*D. Reddick.*

1050. MACKIE, D. B. Some observations on citrus canker. *California Citrograph* 3: 231, 244-245. 1918.

1051. MARTIN, W. H. Tomato spraying experiments at Riverton, N. J. *New Jersey Agric. Exp. Sta. Rept.* 1917: 540-561. 2 pl. 1918.—Coöperative experiments for the control of tomato leaf spot (*Septoria lycopersici*) begun in 1916 were continued. The scope of the work was broadened to include tests of several modifications of Bordeaux mixture as well as to determine the relative merits of traction and power sprayers.—The sprays tested controlled the leaf spot in the following order: (1) 4: 2: 3: 50, (2) 4: 4: 3: 50, (3) 0.5: 0: 3: 50, (4) 4: 4: 50, (5) 2: 0: 4: 3: 50 (the third digit referring to pounds of resin fish oil soap). While the Bordeaux soap mixtures gave best control the standard Bordeaux mixture gave

greatest returns. The copper-resin fish oil soap proved very efficient. Pickering's Bordeaux mixture proved to be of little value.—Little difference resulted from the use of the power and traction sprayers; the latter, due to its lower cost of up-keep would appear the better.—Early spray applications for the control of leaf spot do not appear to be essential under New Jersey conditions. The results indicate that if a majority of the leaves are held until frost a large part of the fruit formed will not ripen. The advisability of spraying late varieties of tomatoes under certain conditions is questioned. The results emphasize the importance of spraying at the proper time.—W. H. Martin.

1052. MARTIN, W. H. Tomato spraying experiments at Salem, N. J. New Jersey Agric. Exp. Sta. Rept. 1916: 575-583. 1 fig. 1918.—A report of spraying experiments for the control of leaf spot of tomatoes, caused by *Septaria lycopersici*. The work was designed to determine (1) the best strength of Bordeaux mixture to be used; (2) the proper time to make the applications.—The 4:4:50 mixture gave best results. All the sprays tested gave increased returns over the unsprayed plots. While the results obtained tend to favor early applications this is due, in large part, to the protection afforded the young plants from insect injury. Fruits from sprayed plants had a better color and firmer texture than fruit from similar, unsprayed plants. The results indicate that spraying has little, if any, influence on tomatoes grown for the cannery or late market.—W. H. Martin.

1053. McMURRAN, S. M. Preventing wood rot in pecan trees. F. S. Dept. Agric. Farmers' Bull. 993. 8 p. 1918.

1054. McRAE, W. *Phytophthora Meadli* n. sp. on *Hevea brasiliensis*. Mem. Dept. Agric. India, Bot. Ser. 9: 219-273. Pl. 1-3, 3 fig. 1918.—A disease of *Hevea brasiliensis* in India, caused by an apparently new species of *Phytophthora*, is described. Detailed symptoms of the disease as it occurs in the field as well as microscopic characters of affected tissues are given. The fungus was obtained and grown in pure culture. Inoculation experiments were performed on the various parts of the host and the fungus reisolated from the artificially infected parts. While in nature the fungus has been found only on *Hevea brasiliensis*, artificial infections have been induced on *Manihot glaziovii* and *Ricinus communis*. Morphological comparisons with other described species of *Phytophthora* convince the writer that it is a new species and it is designated as *Phytophthora Meadli* n. sp. The fungus during the dry season is found as mycelium in the dead branches and as aepores in the shrivel-up fruits. Removal of diseased branches and fruit, and the destruction of the flowers in order to prevent the formation of fruit, are suggested as possible remedies. J. R. Robinson.

1055. McRAE, WILLIAM. A new species of *Phytophthora* parasitic on the Para rubber tree. Jour. Bombay Nat. Hist. Soc. 25: 760. 1918.

1056. MEIER, F. C. Relationship of fungous diseases to the watermelon industry. Off. Minutes Melon Distributors' Assoc. 4: 19-28. 1918.

1057. MELHUS, I. E., AND J. C. GILMAN. An improved method of potato seed treatment. Iowa Agric. Exp. Sta. Circ. 57. 8 p., 3 fig. 1919. A brief discussion is given of the occurrence of black leg, black scurf, common scab, and dry rots of the potato. The hot formaldehyde method for potato seed treatment is described and recommended as a control measure. This consists of dipping the seed in a hot formaldehyde solution for 2 minutes at 48° to 50°C., piling the potatoes 6 to 8 inches deep and covering for one hour. I. E. Melhus.

1058. METCALF, HAVEN. The problem of the imported plant disease as illustrated by the white pine blister rust. Mem. Brooklyn Bot. Gard. 1: 327-333. Pl. 6-7. 1918. A brief history of white pine blister rust, caused by *Cronartium ribicola*, particularly its introduction and spread in U. S. A.—“The entire blister rust problem is, however, but one phase of a larger problem, which may be stated as follows: does free trade in plant diseases and insect pests pay? Is it an economically sound national policy? Is the entire importing nursery

business worth as much to the country as the damage which it has already caused? Not a single plant disease or insect pest that has once become established in this country has been eradicated or, in the present state of knowledge, is ever likely to be. No matter how well controlled, it remains in every case a permanent tax against our economic resources. Even if we succeed in controlling the white pine blister rust we may be absolutely certain that other diseases and pests are being introduced which will be just as serious, for we know definitely that the undesirable plant immigrants are not yet all here. It is much more important to safeguard the country against further invasions of this kind than to control this or any other disease or pest that has already been carelessly permitted to establish itself."—*D. Reddick*.

1059. METCALF, HAYEN. Summary of the white-pine blister rust situation. *Jour. Forestry* 16: 85-89. 1918. Remarks at the close of the conference of the Committee on the suppression of Pine Blister Disease in North America, held at Pittsburgh, Pennsylvania, Nov. 12, 13, 1917. [See Bot. Abstr. 1, Entry 137.]

1060. MORRET, S. La dégénérescence des pommes de terre. [Degeneration of potatoes.] *Jour. Agric. Prat.* 31: 327-329. 1918. Degeneration is considered a grave malady of the potato, threatening to exterminate many varieties. No definite causes of this trouble have been established, but they are supposed to be complex and diverse. An important rôle is attributed to the continuous planting of the same stock on the same soil. *Filolité* (spindly sprout) and *hardent* (failure to germinate) are said to be the two general and characteristic manifestations of the disease. The writer reviews certain previous literature on this subject, appearing in England, Germany, and France. He names a number of varieties for the support of the theory that the smooth-eyed varieties are less resistant than the deep-eyed varieties, although exceptions are given. The effect of continued asexual propagation is admitted, but attention is called to the fact that there, too, is a marked difference in resistance. Much importance in combating degeneration is attached to the frequent renewal of seed potatoes, which should be introduced preferably from cool regions every three or four years at least. As additional measures the author suggests sunning of the seed tubers for germination, rejection of all the spindly sprout specimens, selection of more vigorous and healthy hills, and repeated spraying to prevent other contributing diseases. If in spite of all this cure varieties run out, it is best to discard them altogether.—*H. A. Edson*.

1061. NOWELL, WILLIAM. Infection of orange fruit through bug punctures. *Agric. News, Barbados* 17: 112. 1918. The sweet orange has been added to the list of fruits serving as hosts for the fungi associated with the internal boll disease of cotton. *Nematuspora* sp., the species *D* of Nowell, was found in the pulp near the surface of an orange purchased in Barbados and said to have come from Grenada.—*D. Reddick*.

1062. NOWELL, WILLIAM. *Fomes lucidus* as a parasite of trees. *Agric. News, Barbados* 17: 46. 1918. Brief note on the occurrence of *F. lucidus* on *Pithecolobium saman* and *P. unguis-cati* with a review of recent literature on the subject.—*D. Reddick*.

1063. PAINE, SYDNEY G. Internal rust spot of the potato tuber (Preliminary communication). *Ann. Appl. Biol.* 5: 77-79. 1918. Brownish red spots which characterize the disease are distributed throughout the flesh of the tuber. They consist of cells with thickened and strongly liquified walls containing brown protoplasm in which starch grains may be embedded or the starch may be replaced by globules of oil or tannin. The symptoms of the disease correspond exactly with those described by HORNE (*Jour. Agric. Sci.* 3: 323) as internal disease, and by MAYER (*Journ. für Landwirtschaft* 55: 304). A. B. FRANK (*Kampfbuch g. d. Schädlinge unserer Feldfruchte*, Berlin, 1897, p. 211). SORATER and HÖRIG (*Pflanzenschutz*, Berlin, 1910, p. 154). B. FRANK (*Ber. Deut. Bot. Ges.* 16: 287), as "Buntwerden," "Eisenfleckigkeit," "Buntheit," and "Stoekfleckigkeit." An organism has with difficulty been isolated and shown to be the cause of the disease which has hitherto been regarded as physiological.—*H. A. Edson*.

1064. PAINE, SYDNEY G. An epitome of bacterial diseases of plants in Great Britain and Ireland. *Ann. Appl. Biol.* 5: 62-67. 1918.—Bibliography of 50 citations.—Bacterial diseases which have been studied are white rot of turnips and other vegetables, *B. carotovorus*; heart rot of celery, *B. carotovorus*; black leg of potato, *B. atrosepticus*; hyacinth yellows, *P. hyacinthi*; black rot of crucifers, *P. campestris*; a disease of *Pisum sativum* caused by *P. seminum* Caley, which is present in the cotyledons, germinates with the seed, passes up the stem in the mobile stage, and is found in the seed pod; and a bacterial blight of peach blossoms which was discovered to be of bacterial origin by BARKER AND GROVE in 1913. The disease and causal organism are described briefly and the opinion is expressed that the organism, which is not mentioned by name, is identical with one obtained by Dodge in South Africa from a similar disease. Potato scab, crown gall, brown rot of potato, and Iris rot, all probably identical with the American diseases of the same names, are present but uninvestigated. Bacterial blight (blossom end rot) of tomatoes, orchid leaf spot, leaf roll of potato, mosaic of tomato, sprain of potatoes, and silver leaf disease are also included as of probable or possible bacterial origin.—H. A. Edison.

1065. PAMMEL, L. H. The extermination of the common barberry to prevent crop leakage due to stem rust. *Iowa Conservation* 2: 4-8. 1918. A review of the literature is given on stem rust (*Puccinia graminis*) and the object of the barberry eradication campaign as carried on in Iowa and the spring wheat district of the Middle West. —I. E. Mathus.

1066. PANTANELLI, E. Sul la resistenza delle piante al freddo. [On the resistance of plants to cold.] *Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend.* V, 27: 126-130, 118-153. 1918.—See Bot. Abst. 2, Entry 1135.

1067. PETCH, T. The application of preservatives to renewing bark of rubber. *Trop. Agric.* 51: 40-45. 1918. Experiments were performed to determine what amount of injury is caused to renewing bark by various preservatives. The extent of penetration was determined microscopically. It varies from no penetration to 0.8 mm., according to the material used. Maximum penetration has occurred within 10 days after the date of treatment. The following substances were used, usually full strength and in several dilutions or in mixtures: coal tar, liquid fuel, "Brunolum," "Brunolum plantarium," "Carbolinum plantarium," "Jodelite," "Izal," coke-still residue, "Cargill's" mixtures "A" and "B." None produced injury and there was no spontaneous exudation of latex following treatment. The liquids are easiest to use. "Brunolum," "B. plantarium," "Carbolinum plantarium" and "Jodelite" in 20 per cent strength are used to cure bark rot. They are to be applied as soon as the disease appears and 6 applications are made at intervals of 3 days. These materials in 5 per cent solution are used to prevent bark rot (black stripe). They are applied after every tapping.—D. Reddick.

1068. PETHYBRIDGE, GEORGE H. Investigations on potato diseases. Ninth report. *Dept. Agric. and Tech. Instr. Ireland* 18: —. 1918. Report of experiments carried on during summer of 1917. Burgundy mixture proved quite as efficacious as Bordeaux mixture in preventing late blight (*Phytophthora*). Spraying programs of two, three and four applications each, applied at suitable intervals, gave consecutively better results than that of a single application applied early in the season. One per cent Bordeaux mixture cannot be recommended unreservedly even though, in many cases, it gives as good results as the two per cent.—The varieties tested for resistance to late blight were found to vary from highly resistant to susceptible. Clifton Seedling and Champion II proved strongly resistant; "K" Seedling, Shamrock and Northern Invincible are recorded as resistant. Great Scot, Dominion, Burnhouse Beauty, Provost and Kerr's Pink which are immune to black scabs (*Chrysophyctis*) were found by no means to be immune to late blight, pink rot (*P. erythraea*) or corky scab (*Spongospora*).—Charles R. Stevenson.

1069. RAMIREZ, ROMÁN. Enfermedades del camote. [Diseases of the sweet potato.] *Rev. Agric. [Mexico]* 2: 344. 1918.—In March of 1918 there appeared in Lower California

for the first time a serious disease of the sweet potato which caused the loss of the crop. There was a whitish streaking in the tender potato and an ooze to which the dirt adhered. Fungous hyphae were found but no fruiting bodies. The disease is attributed to *Oozonium omnivorum*.—F. M. Blodgett.

1070. RAMÍREZ, ROMÁN. Manifestation rara en una cebolla. [A rare affection of an onion.] *Rev. Agric. [Mexico]* 2: 34. 1 fig. 1918.—An onion was found with the base of the leaves decayed and partially covered with a stiff, whitish foam. A bacterium was found and partly described but inoculations resulted negatively.—F. M. Blodgett.

1071. REDDICK, DONALD. Protecting the orchard by dusting. *Trans. Indiana Hortie. Soc.* 1917: 126-139. 1918.

1072. REDDICK, DONALD. Some essential facts about apple scab. *Trans. Indiana Hortie. Soc.* 1917: 84-92. 1918.

1073. RITZEMA BOS, J. Ziekten bij kool. [Diseases of cabbage.] *Tijdschr. Plantenz.* 24 (Bijblad): 26-35. Fig. 1-3. 1918.—Further information for growers in Holland, concerning the club root of cabbage, caused by *Plasmidiophora brassicae*.—G. F. Puttick.

1074. SANDERS, G. E., AND A. KELSALL. Some miscellaneous observations on the origin and present use of some insecticides and fungicides. *Proc. Ent. Soc. Nova Scotia* 1918: 69-75. 1919.

1075. SANDERS, G. E., AND A. KELSALL. A copper dust. *Proc. Ent. Soc. Nova Scotia* 1918: 32-37. 1919.—2.5 pounds of powdered, dehydrated copper sulfate (CuSO_4) was mixed with 80 pounds of dry, hydrated lime ($\text{Ca}(\text{OH})_2$) and to this was added 7.5 pounds of dry arsenate of lime (40 per cent. As_2O_3). This provides for 5 per cent metallic copper and 2 per cent metallic arsenic and is referred to as 5:2 copper arsenic dust. Tests were made on potatoes using about 50 pounds of 5:2 dust per acre. The dust mixture gave as good or better results than liquid Bordeaux with an arsenical both in the control of late blight (*Phytophthora*) and of the potato beetle (*Phoradora*). Tests on apples are inconclusive as to the fungicidal and insecticidal value of the mixture but no injury followed the use of a 5:2 dust mixture. Data on the relative cost of material for dusting and for spraying as well as the relative cost of making the applications are included. "The dust here described has proved promising in experiments and is worth further trial."—D. Reddick.

1076. SANDERS, G. E., AND W. H. BRITAIN. A modified Bordeaux mixture for use in apple spraying. *Proc. Ent. Soc. Nova Scotia* 1918: 51-61. 1919.—A short review of the chemistry of Bordeaux mixture and of injury to foliage from its use. Lime-sulfur solution applied with high pressure and greater capacity nozzles was found to cause such injury that it became necessary to find a harmless and efficient substitute. The authors give a preliminary report of their experiments with a Bordeaux containing a large excess of lime. Bordeaux of the standard formula was compared with 2:10:40 and 3:10:40 formulae. Where three parts of lime to one of copper sulfate was used the injury (yellowing of foliage and dropping of fruit) was reduced to a minimum. They conclude that it is unsafe to use less than three parts of lime to one of copper sulfate in making Bordeaux for repeated applications to the apple. There is indication that substituting "soluble sulfur" (1 pound to 40 gallons water) in the third spray will greatly reduce or entirely eliminate russetting of fruit. To this spray material should be added $\frac{1}{2}$ pound calcium arsenate (40 per cent. As_2O_3) for biting insects and 5 pounds of hydrated lime to prevent injury from this arsenical. This excess-lime Bordeaux compares favorably with sulfid sprays in the control of apple scab even on the susceptible McIntosh variety. It is growing rapidly in favor in Nova Scotia and New Brunswick.—L. R. Hester.

1077. SCHOEVEERS, T. A. C. Iets over wortelknobbels en andere kankerachtige uitwassen bij planten. [Concerning root galls and other canker-like growths on plants.] *Tijdschr.*

Plantenz. 24: 123-148. 1918.—The author discusses the symptoms, history and methods used in determining the cause of so-called crown-gall disease. Erwin F. Smith's researches on the disease are described in detail.—G. F. Puttick.

1078. SOUTH, F. W. Buried coconut trunks and root diseases of rubber. Agric. Bull. Fed. Malay States 6: 269-270. 1918.—Two root diseases of rubber trees caused by *Hymenochaete naria* and *Poria hypolateritia* are attributed to the burying of coconut trunks in holes between the rows of rubber trees.—J. Rosenbaum.

1079. SOUTH, F. W. Revised distribution of pink disease by mukims. Agric. Bull. Fed. Malay States 6: 389-394. 1918.—It has been found that the river mukims are free from the pink disease.—J. Rosenbaum.

1080. SPRENGER, A. M. Gloeosporium lindemuthianum in princess-boonen. [G.I. on beans.] Tijdschr. Plantenz. 24 (Bijblad): 20. 1918.—In controlling the disease, it is emphasized that elimination of diseased seed does not always produce the result desired, for practical reasons. Hence, the necessity of using formalin treatment also. It is suggested also that infection may take place through spores in the soil or from neighboring infested fields.—G. F. Puttick.

1081. STAKMAN, E. C., and M. N. LEVINE. Effect of certain ecological factors on the morphology of the urediniospores of *Puccinia graminis*. Jour. Agric. Res. 16: 43-77. 1919.—A study of the effect of hosts and of such factors as light, heat and humidity on the morphology of urediniospores.—It was determined that the amount of inoculum used has no perceptible effect on the result of infection or on the size of spores; that the optimum period of exposure to conditions favorable for infection is 48 hours; that the superficial layer in such uredinium contains spores of larger dimension than those beneath it; that in determining the size of spores measurement of 100 individuals from several uredinia gives accurate results and that in stating the size of spores the use of biometrical mode offers a practical basis for comparison.—The following biological forms of *Puccinia graminis* were investigated: *tritici*, *tritici-compacti*, *secalis*, *avenae*, *phleipratorensis*, and *agrostis*. When grown on congenial hosts and under identical conditions it is found that urediniospores of these forms have a definite size, shape and color and it may be that they "represent incipient morphological species." The form *avenae* is an exception in so far as shape and size are concerned, these being very plastic.—Biologic forms are not unified by continued growth on common and congenial hosts, but on uncongenial hosts the size of uredinium and of spores is reduced.—If the host is supplied plentifully with water and light, optimum temperature for the development of the rust ranges between 66.5° and 70°. Above 70° the incubation is retarded 1 day for every 10° rise of temperature and below 66° it is retarded 1 day for every 5° fall.—The fungus attacked more severely plants grown in wet soil than those grown with a moderate amount or with very little water and the urediniospores are larger on such plants.—The fungus developed better on plants grown under fairly high light intensity than under a low one and the size of urediniospores was correspondingly larger.—The virulence of the parasite, and size of spores is not affected by the age of the host plant providing the host is healthy. Similarly, the length of association of a rust with its host after the uredinium has burst until the formation of teliospores) does not impair the vitality of the fungus nor is the size of urediniospores in the next generation affected.—D. Reddick.

1082. STAKMAN, E. C., M. N. LEVINE, and J. G. LEACH. New biologic forms of *Puccinia graminis*. Jour. Agric. Res. 16: 103-105. 1919.—About a dozen distinct forms are now known. The new forms have been tested on 25 strains and varieties of *Triticum aestivum*, *T. durum*, *T. compactum*, *T. dicoccum* and *T. monococcum* as differential hosts. Only one variety, Khalpi, an emmer originally imported from India, is not susceptible to some one or more of the known strains of the fungus.—The discovery of these new forms is an added reason for eradicating the rust-susceptible varieties of barberry (*Berberis*) as a means of rust control in northern U. S. A. It also explains why a variety of wheat may be immune in one

section and not in another and makes questionable the advisability of attempting to develop rust resistant wheats until more is known about the specialization of parasites.—D. Reddick.

1083. STEVENSON, JOHN A. Cuarentena de plantas. [Quarantine of plants.] Rev. Agric. Puerto Rico 1: 176-180. 1918.—Reasons why a plant quarantine is necessary are given with examples cited of diseases and insects that have caused serious losses when introduced into various countries and examples of diseases that have not yet reached Porto Rico.—F. M. Blodgett.

1084. STEVENSON, JOHN A. La enfermedad de las raíces de la caña. [The disease of sugar cane roots.] Rev. Agric. Puerto Rico 1: 269-279. Figs. 50-52. 1918.—This title is used to include root rots caused by *Moraximus sacchari*, *Himontia stellifero*, *Odontia saccharicola* and other fungi not named. Losses from root-rots are general all over the island and range from negligible amounts to 50 per cent of the crop. Preventive measures are discussed including resistant varieties, care in obtaining seed pieces, good methods of culture and rotation of crops.—F. M. Blodgett.

1085. STEVENSON, JOHN A. Marchitez y falta de desarrollo en las plantaciones de cacao da la República Dominicana. [Poor condition of cacao in Santo Domingo.] Rev. Agric. Santo Domingo 14: 265-273. 1918.—During a trip of several weeks in Santo Domingo the author found cacao plantations were in poor condition. The usual diseases of cacao were not found to be so destructive as were poor conditions of planting, cultivating and fertilizing which lead to a weak condition of the trees and attacks by wound parasites.—F. M. Blodgett.

1086. STEVENSON, JOHN A. La enfermedad nueva de la caña. [A new disease of sugar cane.] Rev. Agric. Puerto Rico 1: 18-25. Fig. 1-2. 1918.—A new sugar cane disease is described which has rapidly spread to most of the cane growing regions on the north and south sides of the island. This disease named "taetizada" or mosaic produces light yellowish stripes with irregular margins in the cane leaves, dwarfs the plant, causes the stalks to shrivel and in extreme cases to canker. It is carried by pieces of stalk from diseased plants when used in planting new fields. It appears to be a typical mosaic disease as no fungi, insects, fertilizers or soil conditions were found to cause the disease. Means of spread other than use of diseased stalks in planting have not been determined. Work aimed at securing resistant varieties has been undertaken with good prospects.—F. M. Blodgett.

1087. STEVENSON, JOHN A. Cuarentena de plantas en Puerto Rico. [Quarantine of plants in Porto Rico.] Rev. Agric. Puerto Rico 1: 213-216. 1918.—In a short review of the quarantine law of Porto Rico, it is stated that the first law was passed in 1905, a new law was passed in 1910, added to in 1914 and amended in 1915. A summary is also given of the number of inspections made and the insects and diseases intercepted.—F. M. Blodgett.

1088. STEVENSON, JOHN A. Catalogo de las enfermedades fungosas y no-parasiticas que atacan las plantas economicas de Puerto Rico. [Catalog of the fungous and non-parasitic diseases of cultivated plants in Porto Rico.] Rev. Agric. Puerto Rico 2: 19-27. 1918. Same title. *Ibid.* 2: 23-33. 1919.—A list of the more important diseases of economic plants of Porto Rico arranged alphabetically by hosts with short descriptions of symptoms and methods of control.—F. M. Blodgett.

1089. STEVENSON, JOHN A. La enfermedad del mosaico del tabaco. [Mosaic disease of tobacco.] Rev. Agric. Puerto Rico 2: 39-44. 1918.—This disease is very common in Porto Rico. A review of the symptoms, cause and control is given.—F. M. Blodgett.

1090. TISDALE, W. H. Physoderma disease of corn. Jour. Agric. Res. 16: 137-151. Pl. A-B (colored) and 10-17. 1919.—*Physoderma zeamaydis* on *Zea mays* has been present in the United States at least since 1912. Its known distribution is roughly the southeastern quarter of the States which include much of the corn belt of the Mississippi Valley. The region where the disease is of importance is the seven southeastern states. In occasional fields

the loss on account of the disease has been as high as 6 to 10 per cent but in the infested area as a whole the damage has not been great.—All the varieties of maize seem to be equally susceptible to attack and teosinte (*Euchlaena mexicana*) is also affected.—Lesions occur on blades, sheath and culm and at first are very similar to those of rust caused by *P. sorghi*.—Recently matured sporangia germinate readily in a film of water if supplied abundantly with oxygen and if the temperature is kept between 23° and 30°. From 20 to 50 zoospores are formed. After 1 to 2 days the zoospores germinate by sending out very fine fibrous hyphae which penetrate the epidermal cells. Within two days penetration has been accomplished and large swollen fungous cells may be formed.—The organism seems to be an obligate parasite. Artificial inoculations in greenhouse and field resulted in infection, the incubation period being 10 days.—Sporangia are resistant to low temperature (–8°F.) and if kept moist retain their vitality over winter.—The fungus is disseminated by the wind and probably by other agencies, e.g., flowing water, insects and various animals.—No definite means of control is known but sanitation, rotation and disease resistant varieties offer possibilities.—*D. Reddick*.

1091. VAN HALL, CONSTANT JOHAN JACOB. De bescherming der cultuurgewassen tegen nieuwe ziekten en plagen uit het buitenland. [Protection of cultivated plants against new diseases and enemies from foreign countries.] *Teyssmannia* 29: 62-95. 1918.

1092. VENKATA RAO, M. K. The pest act against kolsroga and its application. Mysore Agric. Calendar 1919: 17-20. 1919.—Statement of the pest act of October, 1917 which compels owners of areca palm to spray their groves to control Koleroga or rot disease of the nuts caused by [*Phytophthora arecae*]. Enforcement of the act in one village comprising about 50 acres resulted in complete suppression of the disease.—*D. Reddick*.

1093. VINCENS, F. Quelques maladies des plantes cultivées au Pará, Brésil. [Some disease of the cultivated plants of Para, Brazil.] *Bull. Soc. Path. Veg. France* 5: 45-53. *Fig. 1-5*. 1918.—Leaf burn of tobacco caused by *Cercospora nicotianae* is described and figured. Prompt and careful picking of the leaves and burning of the badly diseased ones is recommended to reduce loss. Leaf spot of rice caused by *Cercospora orizae* is described and figured but not considered serious. Red leaf spot of sugar-cane occurs but is negligible. A disease of the branches of cacao caused by *Lasiidiplodia theobromae*, a witches'-broom of unknown cause, a leaf spot caused by *Phyllosticta theobromicola* n. sp. and a disease of young fruit of the same host due to *Gloeosporium theobromicola* n. sp. are described, and the fungi figured. A disease of the leaves of *Anacardium occidentale* caused by *Dendrodubium paranaense* n. sp. is also described and figured.—*C. L. Shear*.

1094. VINCENS, F. Nécrose des feuilles de pin due au *Pestalozzia truncata* Levellé. [Necrosis of pine leaves caused by *Pestalozzia truncata*.] *Bull. Soc. Path. Veg. France* 5: 27-31. *3 figs.* 1918.—A necrosis of leaves of *Pinus sylvestris* beginning toward the upper end of the leaf and finally causing the death of the terminal part is described. Microscopic examination of the diseased tissue showed fungous hyphae present. The diseased leaves in moist chamber produced a *Pestalozzia*. This is referred to *P. truncata* Lev. and is believed to be the same as the later *P. hartigii* Tub., also found on pine. The parasitism of the *Pestalozzia* found and its causal relation to the necrosis is regarded as probable, though the few inoculation experiments made gave negative results.—*C. L. Shear*.

1095. WEIR, JAMES R. Forest disease surveys. U. S. Dept. Agric. Bull. 658. 23 p., 22 *figs.* 1918.—Detailed methods, based on experience, are pre-ented for conducting forest disease surveys in conjunction with timber-survey projects. Such surveys will furnish data of value in conducting future sales of the areas in question.—Maps indicating principal areas of infection can be compiled from survey data and are of value in the appraisal, marking and general administration of the area.—*D. Reddick*.

1096. WEIR, JAMES R., AND ERNEST E. HUBERT. A study of heart-rot in western hemlock. U. S. Dept. Agric. Bull. 722. 37 p., 13 fig. 1918.—Western hemlock (*Tsuga heterophylla*) is now coming into use but there is prejudice against it due primarily to susceptibility to heart rot and rapid deterioration after cutting.—*Echinodontium tinctorium* is the cause of practically all the heart rot in the Northwest. The fungus and stringy, brown, heart-rot it produces are described and illustrated in detail. The fungus enters mainly through branch stubs.—In general, the sites and associations of western hemlock are favorable to the development of decay, the moisture relation being of seemingly greatest importance. In addition, the absence of any great amount of resin, the tolerant habit of the species, the early and abundant formation of branch stubs and the large number of spores produced by the fungus, are likewise factors in the rapid and extensive development of decay.—The environmental factors of the river bottoms are more favorable to early and extensive decay than are those of the southwestern slopes.—Two means of control are suggested (1) a rigid sanitation clause in timber sale contracts providing for destruction by fire of all infectious cull material including infected trees usually left standing, and (2) pathological surveys to determine proper cutting age of hemlock.—D. Reddick.

1097. WENNINK, C. S. De gevolgen der bladrolziekte bij aardappelen. [Control of leaf-roll of potatoes.] Tijdschr. Plantenz. 24 (Bijblad): 1-4. Fig. 1-5. 1918.—The author conducted an experiment over one season, the results of which substantiate the statement by Quanjer that potatoes free from the leaf-roll disease can be produced by careful seed selection and by growing on non-infested land.—G. F. Pullick.

1098. WORMALD, H. A withertip of plum trees. Ann. Appl. Biol. 5: 28-59. Pl. 7-9. 1918.—Disease is characterized by wilting and death of the tips of young twigs, the infection originating in a leaf some distance back from the tip. *Monilia cinerea* develops in such leaves and twigs during the following autumn and spring. This organism in pure culture was used in inoculation experiments and its pathogenicity proved for plum flowers, and wounded fruits. In some instances cankers were formed about the base of the flowering spur. Infection did not occur on leaves nor on unwounded fruits. Apple flowers were artificially infected but in no instance did the fungus extend into the spurs.—This strain of the fungus does not differ morphologically from the one associated with blossom wilt of apples but they are regarded as biologic forms since they differ in their power of causing infection of apple and can be distinguished by cultural and biochemical means.—Destruction of diseased parts is recommended as a control measure.—D. Reddick.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, Editor

1099. ANONYMOUS. Cinchona experiments in the Philippines. Chem. and Druggist 91: 139. 1918.—Seed of *Cinchona Ledgeriana* has been sent from Madras to Luzon where an attempt at cinchona cultivation is to be inaugurated.—E. N. Gathercoal.

1100. ANONYMOUS. Dutch East Indian essential oils. Chem. and Druggist 91: 6-7. 1918.—Cajuput oil, from the leaves of *Melaleuca Leucadendron*, is produced in about 500 distilleries in the Moluccas, mostly by natives in charge of Chinese. Adulteration with kerosene or benzene is not uncommon. The green color, so much desired, is heightened by placing strips of copper in the stills. In 1915, nearly 80,000 kilos were exported, 16,000 of which went to the United States, and 60,000 kilos are used locally in Java.—Citronella oil, from the cultivated grass, *Andropogon Nardus*, is distilled mostly in Java. 233,326 kilos were exported in 1915, 63,560 kilos coming to the United States while nearly 516,000 kilos were exported in 1917, the United States receiving 205,000 kilos.—Lemongrass oil, from *Cymbopogon citratus*, is produced in relatively small quantities, for in quality it cannot compete with the Cochinchina and Reunion lemongrass oils.—Cananga or ylang-ylang oil, from the fresh flowers of the tree, *Artabotrys odoratissima*, is produced from a large plantation on the island of Bantam.

350 kilos of flowers yield 1 kilo of oil. The quality is not as good as the Manila ylang-ylang oil.—Patchouli oil, from *Pogostemon Hyemans*, is distilled to some extent on the east coast of Sumatra.—E. N. Gathercoal.

1101. ANONYMOUS. Indian drug research. Chem. and Druggist 91: 5. 1918.—By resolution before the Bombay Legislative Council steps have been taken to start a pharmacological laboratory or research institute in medicine for scientific experiment with and research into indigenous drugs. The Government encouraged the idea and established a strong committee to prepare a scheme for the development of the institute.—E. N. Gathercoal.

1102. ANONYMOUS. Quinine in India. Chem. and Druggist 91: 57. 1918.—India produced sufficient cinchona bark and quinine for her own needs until 1892. From 1892 to 1901 she produced about 250,000 pounds of bark annually and imported as much more. By 1910 the annual production had increased to 400,000 pounds of bark annually. In 1917 18, 55,000 pounds of quinine was produced at the Madras factory and the total production of bark exceeded 2,000,000 pounds. Government has secured a tract of 400 square miles in Burma for cinchona plantation. It now has 1188 acres in cinchona, occupied as follows: *Cinchona officinalis* 13,000 trees, *C. Ledgeriana* 876,000 trees, hybrids 610,000 trees. However, only 87,000 pounds of bark were harvested last year and it will be ten to fifteen years before the whole plantation comes into bearing. Eventually India can not only supply herself but the Empire with quinine.—E. N. Gathercoal.

1103. ANONYMOUS. Quilaquils Indica, a substitute for Santonica. Devenport. Schweiz. Apoth. Zeitzg. 56: 522. 1918.—The plant which furnishes this substitute belongs to the Combrétaceae and grows wild in the tropical regions of Asia, America, and Africa. Only the seeds are used in medicine. The best drug comes from the province of Szechouan which furnishes it in large quantities. The seeds contain an active principle resembling santonin and possess anthelmintic properties. The maximum dose is 7.5 g. for adults.—H. Kraemer.

1104. DOMINGUEZ, J. A. Cultivation of medicinal plants. Semana Medica (Buenos Ayres), through Jour. Amer. Med. Assoc. 72: 461. 1919.—Dominguez, director of the Institute of Botany and Pharmacology of the University of Buenos Aires, replies to an inquiry from the government in regard to the feasibility of cultivating the cinchona in Argentina. He advises starting with the *C. succirubra* as the hardiest species. If this succeeds, then others could be tried. Near the equator a high altitude is desirable. In Java the official plantations are at 1200 to 2350 meters but some private plantations are as low as 550 meters. All known plantations are above this altitude except in Australia where, although at an altitude of only 33 meters, the bark has yielded 6.5 per cent of alkaloid. The *C. Calisaya* seems to do best at an altitude of 2000 meters. With higher altitudes the levorotatory alkaloids seem to increase while the proportion of dextrorotatory decreases. The cinchona plants can bear a temperature of 2°C. but at freezing point or below they are seriously injured, as also with very high temperatures. The admissible range is from 4 to 33°C. that is, a minimal average of 15° and a maximal average of 27°C. The rainfall has to be at least 1200 mm.; in the Java plantation the annual precipitation is 2300 to 4500 mm. with a maximal humidity of 96 per cent. There is no yield the first four years.—Wm. B. Day.

1105. EWING, C. O., AND E. E. STANFORD. Botanicals of the Blue Ridge. Jour. Amer. Pharm. Assoc. 1: 16-26. 1919.—This paper gives an account of a visit to the Blue Ridge region for the purpose of making a survey of the drug plants growing there and to make a special study of the conditions of the drug trade of this locality, the methods employed in the collection, drying, preservation and distribution. The effect of the past war and the future of this industry are also discussed.—The paper is characterized by the many items of interest concerning the drug collection in this vicinity as to the actual existing conditions. Illustrated with a series of snap shots of the native drug collectors, warehouses, etc.—A. Hogstad, Jr.

1106. GUÉRIN, M. Adulteration of Cretan dittany with *Calamintha candidissima*. Rept. Pharm. 30: 49. 1919.—Cretan dittany (*Origanum dictamnus*), a Labiate plant, is little used in France and only occurs in the Codex in the formula for "haume de Fioravanti." This plant, a native of Crete, is official in the pharmacopoeias of Denmark, Spain, Mexico, and Sweden. It can no longer be procured in France, but there is found in commerce, under the same name, another plant of the same family, *Calamintha candidissima*, which grows in Algeria.—The Cretan dittany is characterized by reddish flower stalks, broadly ovate leaves, the lower being petiolate and the upper sessile, both covered with a dense whitish tomentum. The flowers form pedunculate spikes surrounded by almost glabrous reddish bracts, 7 to 9 mm. in length. Under a lens the leaves are seen to be covered with glandular hairs.—The Cretan dittany possesses an aromatic odor like that of thyme. It has an acrid pungent taste. The hairs which cover both surfaces of the leaves are long and easily detached by rubbing. The glandular hairs, abundant on the upper epidermis, are bicellular with an eight-celled head where the secretion accumulates under the much distended cuticle. These glands are accompanied by a large number of very small secreting hairs having a unicellular head.—*Calamintha candidissima*, the article which reaches France, consists of short branches and the leaves are whiter than those of Cretan dittany and the odor is less delicate. The hairs which cover the leaves are less easily rubbed off; they are multicellular like those of Cretan dittany, but are shorter and have thinner walls. Their ramifications are more numerous and more complex. The secreting hairs are of two kinds as in *Origanum dictamnus* but larger, especially on the ventral epidermal layer. The secreting head may contain as many as sixteen cells.—To sum up, the leaves of *Calamintha candidissima* are always whiter than those of Cretan dittany; they never have reddish bracts; their odor is less delicate.—H. Kramer.

1107. HAMILTON, H. C. Digitalis leaves: effect on activity of temperature in drying. Amer. Jour. Pharm. 3: 177-183. 1919.—The author first records the results of several workers in regard to the variability of digitalis leaves and their preparations. It is noted that the variations are as high as 400 to 500 per cent. Included with these results are brief descriptions of the methods adopted by the various workers for the drying, preservation and extraction of the digitalis leaves.

The author performed a series of experiments to demonstrate the correctness of the statement made in connection with the drying of digitalis submitted to the Medical Department of the Army, which was grown wild in Oregon, that unless the drying was accomplished in an oven at a temperature ranging from 75 to 90°, it was practically worthless.

The results of the experiments are as follows:—That oven drying has no advantage over a reasonably rapid air drying of digitalis leaves. That the drying causes a marked deterioration when conducted in an oven at a high temperature. That the fresh drug has greater toxicity than the dried drug. That no products more highly toxic than those present in the crude drug are developed during the process of drying.—Two series of tables in tabulated form of the assay results, obtained on the fresh drug, the oven dried and sun-air dried drug are given.—A. Hogstad, Jr.

1108. HOLMES, E. M. Note on Indian Belladonna. Pharm. Jour. 102: 2. 1918.—On the cultivation, curing and packing of Indian belladonna, which is evidently identical with *Atropa Belladonna*. The fact that the plants are grown at a fairly high elevation, 6500 feet, and in rich virgin soil accounts for the high percentage of alkaloid.—E. N. Gathercoal.

1109. HOLMES, E. M. *Strophanthus Semina*, B. P. Pharm. Jour. 102: 33-34. 1918.—It is pointed out that for some years past it has been impossible to obtain pure seed of *S. Kombe* in commerce. Dealers object to importing strophanthus seed in their pods because of the increased cost of freight and handling and as the seeds of *S. Kombe* are not distinguishable with the naked eye from the seeds of numerous other species of *S.* of unknown value, seeds of lower price are sold as genuine *Kombe* seed or are admixed with just enough *Kombe* seed to "swear by." The danger of this carelessness about one of the most valuable heart remedies, when given in proper dose, but which is a dangerous heart poison in too large a dose, is leading to results that may easily prove disastrous. In view of the limited geographical

range of *S. Kombe*, the use of *S. hispidus* which is the only other known species which gives the green reaction for strophanthin and which has a much wider range, might be ordered, as was done in the 9th revision of the U. S. P.—E. N. Gathercoal.

1110. JAVA CINCHONA COMPANIES. Report of West Java Cinchona Planting Co. Chem. and Druggist 91: 50. 1918.—Cinchona bark production in Java was not as good in 1917 as in 1916. The temperature was unfavorable and fungoid diseases caused much trouble. The quinine content dropped from an average of 7.14 to 6.7 per cent genuine sulphate; also the price was lower—10.574 cents against 11.366 cents in 1916. The sales of cinchona bark in Amsterdam were 7,893,362 kilos in 1916 and 5,821,250 kilos in 1917, while the year end stocks were reduced from 47,000 bales to 1384 bales. Quinine manufacture in Java has much increased. An editorial (Chem. and Druggist 91: 53. 1918) states that for the period 1910-1913 the world's production of cinchona bark was 25,225,400 pounds per annum, of which nearly 23,000,000 pounds is credited to Java, 2,000,000 to India and Ceylon and less than 500,000 to other countries.—E. N. Gathercoal.

1111. MENDIOLA, N. B. A study of Philippine bast fibers. Philippine Agric. and Forester 6 (1917): 6-39. 4 pl.—Botanical studies of *Abroma angusta*, *Kleinbafia hirsuta*, *Melochia umbellata*, *Urena lobata*, *Hibiscus sabdariffa*, *Malacca fasciata*, *M. capitata*, *Triumfetta bartramia*, *Grewia multiflora*, and *Wikstroemia ovata*; microscopic studies of the structure of the fibers; and observations on their dimensions and tensile strength, the effect of seasonal rettings, and the commercial value of the various fibers have led to the conclusion that the fiber of *P. arborescens* cannot be extracted by water-retting, that *S. grandiflora* is not a textile fiber, and that none of the species studied can be profitably grown under the labor conditions and methods of manufacture prevailing in the Philippines at the present time. [Abst. in: Exp. Sta. Rec. 8: 739. 1918.]—A. Hogstad, Jr.

1112. TSCHIRCH, A., AND F. WOLTER. Determination of the chemical value of digitalis. Schweiz. Apoth. Zeitg., 56. 470-474, 495-498, 512-514. 1918.—The authors have experimented with four species of digitalis leaves. Their results show that the best method of extraction is that of Reed-Vanderkleed but that it requires much time, 6 days. For solvents they used ether, acetic ether, absolute alcohol, amyl alcohol, benzene, carbon tetrachloride, chloroform, and acetone. Chloroform dissolves only part of the active substances contained in the drug; with absolute alcohol all of the active substances pass into the extract; benzene does not dissolve all of them; acetone is the best solvent for determining the chemical value of digitalis.—The authors employed a modified method of Keller, the leaves of the digitalis being first subjected for extraction by ether in order to remove the oils and chlorophyll. After removing the ether by distillation, the leaves were extracted with absolute alcohol. After purification with lead, the entire glucosides were isolated by acetone, the acetone being separated from the liquid by the addition of sodium chloride. In this manner they obtained a complete exhaustion of the drug and the extract thus obtained has been called pandigitalon and is said to possess all the physiological properties of digitalis. H. Kraemer.

PHYSIOLOGY

B. M. DUGGAR, Editor

GENERAL

1113. SCHMIDT, C. L. A., AND D. R. HOAGLAND. Table of PH , H^+ and OH^- values corresponding to electromotive forces determined in hydrogen electrode measurements, with a bibliography.—Univ. California Publ. Physiol. 5: 23-69. 1919.—An extensive set of tables with a bibliography of 467 titles and notes upon the technique of making electrometric determinations of hydrogen or hydroxyl ion concentrations. The tables give the required equivalent of the potential of either the normal or tenth-normal KCl-calomel electrode and cover

a range of PH values from 0.034 to 14.032. Values are calculated on the temperature basis of 25°C. and a table of factors is given for converting readings made between 18° and 30°C. The bibliography gives a list of works dealing with the theory and use of the methods and with their applications to various types of investigation. The notes describe the basis upon which the computations were made and discuss certain important questions in technique.—*H. S. Reed.*

PROTOPLASM, MOTILITY

1114. LEVI, GUISEPPE. Considerazioni sulla costituzione fisica del citoplasma desunte da nuovi dati morfologici sulle cellule coltivate in vitro. [Cells cultivated in vitro and the physical constitution of protoplasm.] *Atti R. Accad. Lincei, Rend. V, Cl. Sci. Fis., Mat. e Nat.* 27: 136-140. 1918.

DIFFUSION, PERMEABILITY

1115. HARRIS, J. ARTHUR. On the osmotic concentration of the tissue fluids of Phanerogamic epiphytes. *Amer. Jour. Bot.* 5: 490-506. 1918.—The osmotic concentration of the tissue fluids of various epiphytes is much lower than that of terrestrial vegetation and the osmotic concentration of the species of epiphytes of Jamaica is much lower than those of Florida. [See Bot. Absts. 1, Entry 829.]—*R. W. Webb.*

MINERAL NUTRIENTS

1116. SHIVE, JOHN W., AND WILLIAM H. MARTIN. A comparison of salt requirements for young and for mature buckwheat plants in water cultures and sand cultures. *Amer. Jour. Bot.* 5: 186-191. 1918.—Employing the usual methods, the authors conclude that the salt proportions producing the best physiological balance differ in the young and mature stages, and differ also as between water and sand cultures.—*R. W. Webb.*

1117. TOOLE, E. H., AND W. E. TOTTINGHAM. The influence of certain added solids upon the composition and efficiency of Knop's nutrient solution. *Amer. Jour. Bot.* 5: 452-461. 1918.—The weight of dry barley tops was increased by the addition of $\text{Fe}(\text{OH})_3$ to the solution, depressed by carbon black, and unaffected by H_2SiO_3 , whereas the weight and length of roots were little affected in each case. The growing plants exerted a neutralizing effect on the solutions and the weights of dry tops were inversely proportional to the hydrogen-ion concentrations. The higher application of $\text{Fe}(\text{OH})_3$ removed much of the phosphorus of the solution, but yielded the best culture in yield and appearance.—*R. W. Webb.*

1118. TRUE, RODNEY H., OTIS F. BLACK, AND JAMES W. KELLY. Ash absorption by spinach from concentrated soil solutions. *Jour. Agric. Res.* 16: 15-25. 1919.—Heavy application of ruineral fertilizers as single salts and in complete mixtures were made on beds of spinach (*Spinacia oleracea*) at the Virginia Experiment Station. The best growth resulted when the basic complete mixture was used (NaNO_3 , K_2SO_4 , basic slag, dried blood, tankage). Growth was fair with acid phosphate or Na_2SO_4 , poor with heavy applications of NaCl , NaNO_3 , or acid complete mixture ($(\text{NH}_4)_2\text{SO}_4$, acid phosphate, KCl , dried blood, tankage), and poorest with KCl . There was no relation between ash content and growth as the plants showing best and poorest growths, with basic mixture and KCl respectively had the lowest ash contents. The highest total ash in the tops occurred when fertilized with NaCl , manure, CaCO_3 , and acid phosphate, the lowest with KCl and basic mixture. For the roots the highest ash occurred with acid phosphate and manure, the lowest with KCl and NaCl . The amounts present of the Si, K, and Na showed wide fluctuation under different fertilizer treatments, the other element showed little variation. Relative to dry weights, manganese was the only element regularly present in greater quantities in the roots than in the tops. Magnesium was always present in greater quantities than calcium in both roots and tops except when the plants were fertilized with CaCO_3 .—*Otis F. Curtis.*

PHOTOSYNTHESIS

1119. OSTERHOUT, W. J. V. A simple method of demonstrating the production of aldehyde by chlorophyll and by aniline dyes in the presence of sunlight. *Amer. Jour. Bot.* 5: 511-513. 1918.—A method for obtaining aldehyde from chlorophyll in sunlight is described. Aldehyde is also observed when aniline dyes are substituted for chlorophyll. From his experiments, the author believes that the aldehyde is formed by the decomposition of chlorophyll rather than by the decomposition of CO_2 .—R. W. Webb.

METABOLISM (GENERAL)

1120. APPLEMAN, CHARLES O. Special growth-promoting substances and correlation. *Science* 48: 319-320. 1918.—The author concludes that the potato tuber contains a limited amount of a special growth-promoting substance, and that weak, slender sprouts result from a deficiency of this material. [See Bot. Absts. 1, Entry 283.]—R. W. Webb.

1121. DENIS, MARCEL. Sur quelques thalles d'Aneura dépourvus de chlorophylle. [Concerning certain thall of Aneura devoid of chlorophyll.] *Compt. Rend. Acad. Sci. Paris* 168: 64-66. Fig. 1-2. 1919.—See Bot. Absts. 2, Entry 982.

1122. MARSH, C. DWIGHT, and A. B. CLAWSON. Stagger grass (*Chroserma muscaeetozicum*) as a poisonous plant. U. S. Dept. Agric. Bull. 710. 15 p., fig. 1-8. 1918.—That stagger grass contains a substance very toxic to animals is confirmed by experiments with cattle and sheep.—R. W. Webb.

1123. POTTER, R. S., and R. S. SNYDER. The organic phosphorus of soil. *Soil Science* 6: 321-332. Fig. 1-2. 1918.—The organic phosphorus of the soil is studied, particular attention being devoted to its distribution, nature, and acid hydrolysis. The authors conclude that organic phosphorus is not due to colloidal clay, and that the increase of phosphorus in the acid-extracted soil over the non-extracted soil is not due to increased solubility of phytin, inasmuch as phytin is extracted to a negligible extent with 1 per cent hydrochloric acid.—R. W. Webb.

1124. SWANSON, C. O., and E. L. TAGEE. Determination of acidity and titratable nitrogen in wheat with the hydrogen electrode. *Jour. Agric. Res.* 16: 1-13. 1919. The hydrogen ion concentrations in the extracts of ground wheat were determined by means of the hydrogen electrode. The substances produced when wheat is digested in water are not ionized until an alkali has been added. The amount of these substances produced, up to a certain limit, bears a definite relation to the time and temperature used in the digestion.—Henry Schmitz.

METABOLISM, RESPIRATION

1125. APPLEMAN, CHARLES O. Respiration and catalase activity in sweet corn. *Amer. Jour. Bot.* 5: 207-209. Fig. 1. 1918.—Respiration in sweet corn in the milk stage is very high when the corn is pulled, but decreases rapidly with storage. The author finds that catalase activity shows a corresponding decline with storage which is almost directly proportional to the decline of respiration. Potato tubers exhibit a similar relation.—R. W. Webb.

ORGANISM AS A WHOLE

1126. DANIEL, LUCIEN. Cultures maraîchères expérimentales au bord de la mer. [Market gardening experiments on the sea coast.] *Compt. Rend. Acad. Sci. Paris* 168: 115-118. 1919.—See Bot. Absts. 3, Entry 80.

1127. GREAVES, J. E. Azotification. *Soil Science* 6: 163-217. Fig. 1-2. 1918.—The morphology and physiology of *Azotobacter* are extensively studied under the influence of various factors, and the experimental data show the important part that *Azotobacter* plays in maintaining the nitrogen balance of the soil.—R. W. Webb.

1128. ORTERHOOT, W. J. V. *Endurance of extreme conditions and its relation to the theory of adaptation.* Amer. Jour. Bot. 5: 507-510. Fig. 1. 1918.—From the fact that a species of *Tradescantia* lived for two years without soil or water, then grew vigorously on being placed in a saturated atmosphere, and finally grew slightly on being submerged, the author concludes that the explanation of this case, as well as of others must be based on physical or chemical conditions of the protoplasm without reference to direct adaptation.—R. W. Webb.

1129. STAKMAN, E. C., AND M. N. LEVINE. *Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.* Jour. Agric. Res. 16: 43-47. 1919.—See Bot. Abstr. 2, Entry 1081.

1130. WILLIAMS, KATHERINE A. *A botanical study of skunk-cabbage, Symplocarpus foetidus.* Torrey 19: 21-29. Pl. 1-2, fig. 1-13. 1919.—See Bot. Abstr. 2, Entry 981.

GROWTH, DEVELOPMENT, REPRODUCTION

1131. APPLEMAN, C. O. *Physiological basis for the preparation of potatoes for seed.* Maryland Agric. Exp. Sta. Bull. 212: 80-102. Fig. 1-11. 1918.—The author extensively studies the production and growth of sprouts on the potato tuber, as influenced by various factors, concluding that internal inhibitory influences play an important rôle in this phenomenon. He suggests certain principles to be adhered to in the preparation of seed for the practical growing of potatoes.—R. W. Webb.

GERMINATION, RENEWAL OF ACTIVITY

1132. ANDREWS, F. M., AND C. C. BEALS. *The effect of soaking in water and of aeration on the growth of Zea Mays.* Bull. Torrey Bot. Club 46: 91-100. Fig. 1-5. 1919.—Experiments were conducted to ascertain the proper length of time to soak the grains for maximum growth; 12 hours was the optimum. A study was also made of the results of puncturing the grains before soaking and of the effect of punctures in different parts of the grain; under proper conditions puncturing accelerates growth. Plants grown in water cultures that were aerated showed marked improvement over non-aerated, especially when the temperature was kept at a low enough point.—P. A. Munz.

REGENERATION

1133. REED, H. S., AND F. F. HALMA. *On the existence of a growth inhibiting substance in the Chinese lemon.* Univ. California Publ. Agric. Sci. 4: 99-112. Pl. 3-6. 1919.—Discussion of a hypothetical growth inhibiting substance in the Chinese lemon, and of its effects upon the development of new shoots on cuttings. The theory is advanced that the shoots developing nearest the apex form a substance which is capable of inhibiting the growth of subapical buds on the vertical stem. The dominant influence of the apical buds may be prevented from reaching lower buds by notching the phloem layer just above each bud. When the upper part of the cuttings was enclosed in a plaster cast, the development of buds on that portion was prevented, but lower buds developed. After removal of the casts the apical buds grew and showed an inhibitory action on the growth of the lower shoots previously produced.—Horizontal branches or cuttings produced shoots only from the upper side. Rotation of such a cutting after shoots have appeared on the dorsal side permits new shoots to appear on what was previously the ventral side of the cutting. In horizontally placed shoots the inhibiting substance appears to settle to the ventral side of the shoot.—H. S. Reed.

TEMPERATURE RELATIONS

1134. ELLENBERGER, H. B. *A study of bacteria in ice cream during storage.* Cornell Univ. Agric. Exp. Sta. Mem. 18: 331-361. 1919.—Plate counts of ice cream, made immediately after the ice cream was frozen, show a higher bacterial count than the ice cream mixture before freezing. This is probably due to the breaking up of clumps of organisms. There is no very

radical change in number of bacteria with storage. There is a slight decrease the first few days followed by slight increase up to about the tenth day and then a gradual decrease until at the end of 90 days only 30 per cent of the original number remain. Agar plates gave higher counts than gelatine plates and the addition of litmus to the media decreased the total number of bacteria.—*L. Knudson.*

1135. PANTANELLI, È. Sul la resistenza delle piante al freddo. [On the resistance of plants to cold.] *Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend. V*, 27: 126-130, 148-153. 1918.—Pot experiments with nutrient solutions were made with grain, beets, sunflowers, tomatoes and maize.—The removal of heat through the lowering of temperature is the essential cause of death from cold and to this is opposed the resistance of the organs, while the formation of ice is an accessory process. The resistance to freezing is not related to the concentration of the cell sap, nor to its acid or salt content, but to the proportion of sugar that the cells succeed in conserving during the cooling.—*F. M. Blodgett.*

TOXIC AGENTS

1136. DEATRICK, E. P. The effect of manganese compounds on soils and plants. *Cornell Univ. Agric. Exp. Sta. Mem.* 19: 371-402. 1919.—Wheat grown in distilled water containing 20 parts per million of manganese, as manganese sulfate, showed injury, particularly in growth of roots. In a nutrient solution, distinct stimulation of growth was noted with manganese sulfate at a concentration of manganese as high as 400 parts per million. At 10 parts per million the increase was 100 per cent. Manganese chloride and manganese carbonate gave like results. In soil culture (Dunkirk clay loam), wheat grown 7½ months showed a decided increase in yield of grain with 10 or 25 parts per million of manganese. The addition of calcium carbonate along with manganese sulfate seems to delay the heading of wheat. Leaves injured by manganese show relatively high manganese content. Manganese increases oxidizing power of the soil.—*L. Knudson.*

1137. HARTWELL, BURT L., AND F. R. PENNER. The presence of aluminum as a reason for the difference in the effect of so-called acid soil on barley and rye. *Soil Science* 6: 259-279. *Pl. 1; fig. 1-2.* 1918.—With rye and barley plants as indicators, the active factor for the different influence on plants in acid soils proved to be aluminum, and the results indicate that phosphating and liming acid soils may be advantageous in precipitating aluminum, as well as acting as a nutrient and a reducer of acidity.—*R. W. Webb.*

1138. LIPMAN, C. B., AND W. F. GERHKE. Copper and zinc as antagonistic agents to the "alkali" salts in soils. *Amer. Jour. Bot.* 5: 151-170. *Fig. 1-2.* 1918. The data obtained from experiments using Berkeley adobe soil or Oakley sand support the view that the heavy metals exert an antagonistic action to alkali salts for crop plants grown in pots and it is implied that the phenomenon may be of great practical importance.—*R. W. Webb.*

1139. LUDWIG, C. A. The influence of illuminating gas and its constituents on certain bacteria and fungi. *Amer. Jour. Bot.* 5: 1-31. 1918. Various bacteria and fungi fail to exhibit any marked sensitiveness to small amounts of illuminating gas or its constituents, the relatively slight action observed depending on the specific organism and the constituents concerned. The effect of the illuminating gas is considered to be due to the sum of the effects of the constituents and to the deficiency of oxygen. No organism acquired a tolerance to the various gases, but, on the other hand, showed a slight but gradual decline in vigor. *R. W. Webb.*

1140. LUDWIG, C. A. The effect of tobacco smoke and of methyl iodide vapor on the growth of certain organisms. *Amer. Jour. Bot.* 5: 171-177. 1918.—Tobacco smoke appears to be more or less toxic to all the organisms studied—unwashed smoke being more toxic than washed smoke. Methyl-iodide vapor induces a great retardation at first followed by a vigorous growth unless the vapor is of such concentration as to sterilize.—*R. W. Webb.*

1141. LUND, BARBARA LEE. The toxic action of KCN and its relation to the state of nutrition and age of the cell as shown by *Paramecium* and *Didinium*. *Marine Biol. Bull.* 35: 211-231. Fig. 1-3. 1918.

MISCELLANEOUS

1142. ANONYMOUS. Outlook for kelp products. *Pacific Fisherman* 17: 46. 1919.—Note on alginic acid.—T. C. Frye.

1143. BROOKS, CHARLES, J. C. COOLEY, AND D. F. FISHER. Apple scald. *Jour. Agric. Res.* 16: 195-217. Fig. 1-11. 1919.—Apple scald is due to the long continued action of more or less abnormal storage conditions, conditions that cause the production or prevent the elimination of certain waste products. Most varieties of apples may be exposed to unfavorable conditions for several weeks without developing scald and without showing any tendency to the disease if later stored under nearly normal conditions, but they finally reach a certain critical period at which time they are not scalded, yet have developed a tendency to scald that can not be radicated by removing the agencies that were originally responsible for the trouble.—Apple scald is due to volatile or gaseous substances other than carbon dioxide that are produced in the metabolism of the apple. They can be carried away by air currents or taken away by various absorbents, such as excelsior, sawdust, animal charcoal and by wrappers impregnated with various fats. A constant air movement of from 0.12 to 0.25 mile per hour has always either entirely prevented apple scald or has reduced it to a negligible quantity. The intensity of air movement apparently is more important than the continuity, and circulation of air more important than air renewal. Previous work by the authors is summarized, and additional data bearing on certain phases of the question are included.—D. Reddick.

1144. SHREVE, ERITH BELLAMY. The imbibition of water by gelatine. *Science* 48: 324-327. 1918.—This work emphasizes the fact that, when studying the absorption of water by gelatine and other colloidal jellies, the identical history of water content and of water-loss must be carefully considered, also that the greatest shrinking and swelling take place along the axis which is perpendicular to the largest evaporating surface.—R. W. Webb.

1145. WAKSMAN, SELMAN A. The occurrence of *Azotobacter* in cranberry soils. *Science* 48: 653-654. 1918.—*Azotobacter* and *Actinomyces* filaments are found in the soil from a cranberry bog that has previously been limed, but are absent from similar soil that has not been limed. A hydrogen-ion determination is made with each soil extract with the following results: limed, pH 6.2-6.4; unlimed, pH 5.4-5.6. The results show that a greatly increased crop production can be obtained by simply changing the reaction of such soils so as to be favorable to the growth of *Azotobacter*.—R. W. Webb.

SOIL SCIENCE

J. J. SKINNER, *Editor*

1146. McMURRAN, S. M. Pecan rosette in relation to soil deficiencies. U. S. Dept. Agric. Bull. 756. 11 p., figs. 1-4. 1919.—The relation of the rosetting of pecans to soil deficiencies is pointed out. On the river flood plain soils of Louisiana, where the soil is deep and black, of high fertility and water holding capacity the disease is almost unknown. Its occurrence is most prevalent on the unproductive, deep sand and sandy clay soils of the Atlantic and Gulf Coastal plains. It is not found on the fertile soils containing large amounts of organic matter of this region. Experiments showed that the liming of soils did not prevent rosetting, nor was there any relation between acid soils and the rosetting of pecans. Stable manure incorporated in the soil prevented the disease to a large extent. The growing of leguminous crops in the orchard for the purpose of green manuring is recommended.—J. J. Skinner.

1147. NOYES, H. A., AND S. D. CUNNOR. Nitrates, nitrification and bacterial contents of five typical acid soils as affected by lime, fertilizer, crops and moisture. Jour. Agric. Res. 16: 27-42. Pl. 1-9. 1919.—The paper presents results of investigations taking into consideration both the nitrates and bacterial numbers, as well as a correlation of these two, under certain specific conditions.—The data were secured from fine soil samples which were kept under controlled conditions. The soils were all very acid and varied widely in organic matter. Applications of calcium carbonate, 2 to 4 tons per acre, increased nitrate accumulation and gave higher bacterial counts. Other fertilizers were less regular in their effect.—The soils, when fully saturated with water and incubated with ammonium sulphate, did not accumulate nitrates, when one-fourth and one-half saturated they showed considerable increase in nitrate content. Increased moisture content tended to increase aerobic and anaerobic counts.—Bacterial counts are correlated with nitrate accumulation.—J. K. Wilson.

1148. WRIGHT, R. C. Nitrogen relations of certain crop plants when grown alone and in association. Jour. Amer. Soc. Agron. 11: 49-66. 1919.—In a study made of the behavior of representative field crops grown alone and in combination with other crops, the non-legumes, barley, rye, oats, and kafir were each grown in the same soil with one of the legumes, vetch, field peas and red clover; corn was also grown with oats and millet. The soil used in the experiments was contained in large galvanized iron buckets holding 45 grams of moist soil. When 2 species of plants were grown in association, half the number of plants of each were used as when grown alone. Crops were grown to maturity and harvested close to the surface of the soil. When account was taken of the nitrogen occurring in the soil and in the plant after harvesting, it was found that there was a distinct loss of nitrogen when barley was grown with peas, rye with peas or clover, and corn with millet. There was a gain in nitrogen when barley was grown with vetch or clover, oats with peas or clover, and kafir with vetch. In general, when barley and vetch or clover, oats and vetch or peas, and kafir and vetch were grown together, although more dry matter and nitrogen were produced, not so much nitrogen was removed from the soil as when these crops were grown alone. Oats and kafir gained in percentage of nitrogen when grown with vetch, peas or clover, and corn lost with both oats and millet. All other crops gained in percentage of nitrogen when grown with some crops and lost with others. Similar experiments were repeated the following season using 3 types of soil from the states of California, Kansas and Virginia. Oats, barley and kafir were used as the non-legumes, and soybeans and purple vetch as the legumes. For each of the combinations there was found to be a gain of nitrogen during the growth of the crop in one or more of the soils and a loss in the others. Oats and kafir when grown with vetch, and soybeans when grown with vetch, and soybeans when grown with oats or barley gained in percentage of nitrogen in all soils; while barley with soybeans, and vetch with barley or kafir lost in all soils.—W. H. Ross.

1149. GREAVES, J. E., E. G. CARTER, AND N. C. GOLDTHORPE. Influence of salts on the nitric-nitrogen accumulation in the soil. Jour. Agric. Res. 16: 107-135. 5 fig. 1919.—The toxicity of the chlorides, nitrates, sulphates and carbonates of Na, K, Ca, Mg, Mn, and Fe as determined by nitrification is influenced by the specific salt and not by electro-negativity. The quantity of a salt which can be used without decreasing nitrification varies with the salt. The order of decreasing toxicity of the salts on the acid sandy loam used was as follows: Na_2SO_4 , Na_2CO_3 , CaCO_3 , K_2SO_4 , K_2CO_3 , $\text{Fe}(\text{NO}_3)_3$, NaNO_3 , MgSO_4 , FeSO_4 , $\text{Ca}(\text{NO}_3)_2$, KNO_3 , KCl , $\text{Mg}(\text{NO}_3)_2$, $\text{Mn}(\text{NO}_3)_2$, FeCl_3 , MgCO_3 , NaCl , CaCl_2 , and CaSO_4 . The toxicity of some salts increase more rapidly than others. The principal factor seems to be a physiological one due to the action of the substance on the living protoplasm of the cell. The common soil alkalies, CaCl_2 , Na_2SO_4 , Na_2CO_3 , are very toxic to the nitrifying organisms, and when present in sufficient amounts greatly reduce the NO_3 accumulation in the soil. With the exception of Na_2SO_4 , Na_2CO_3 , CaCO_3 , K_2SO_4 , K_2CO_3 and $\text{Fe}(\text{NO}_3)_3$, the salts in some concentrations acted as stimulants of the nitrifying organisms. The compounds which are the strongest plant stimulants are the most efficient in increasing the nitric-nitrogen accumulation in the soil.—J. J. Skinner.

1150. AMES, J. W., AND T. E. RICHMOND. *Effect of sulfonation and nitrification on rock phosphate*. Soil Science 6: 351-364. 1918.—A study was made in different soils of the acidity produced by the sulfonation and nitrification of composts containing rock phosphate. In the sulfonation experiments, 2 grams of sulphur were added to 500 gram portions of the soil without and with varying amounts of CaCO_3 in order to study the effect of the processes in acid soils and in soils supplied with basic material. Oxidation of the sulphur was found to proceed rapidly in an acid soil, approximately 50 per cent being changed to the form of sulfate. CaCO_3 added to an acid soil depressed sulfonation, but in sand mixtures the presence of CaCO_3 was found to be essential. In the absence of other bases the Ca of rock phosphate did not serve as a base for the sulfonating process to any appreciable extent. When phosphato rock was added to an acid silt loam at the rate of 1900 parts per million, the oxidation of sulphur incorporated with the phosphate in the absence of CaCO_3 , or nitrogen carriers, changed 630 parts of phosphorus into a form soluble in neutral ammonium citrate solution. In a basic soil, or when CaCO_3 was added to the mixture, the acidity resulting from sulfonation was neutralized by the Ca present as carbonate, and the solvent action on the phosphate was therefore much less than occurred in the acid soil. When sulphur and dried blood were added to an acid soil, the oxidation of the sulphur proceeded actively but nitrification in the absence of CaCO_3 was practically inhibited by the acidity resulting from the oxidation of the sulphur. The transition from proteid apparently ended with the formation of NH_3 which in turn reacted to neutralize the acidity arising from the sulfonating organisms. Nitrification is stimulated by rock phosphate to a very limited extent. It is not an active agent for increasing the solubility of rock phosphate when mixed with soil.—W. H. Ross.

1151. MCCOOL, M. M., AND C. E. MILLAR. *Some general information on lime and its uses and functions in soils*. Michigan Agric. Exp. Sta. Special Bull. 91. 11 p., fig. 1-9. 1918. The general effect of lime on crops, the sources and the supply in Michigan is discussed. A list of legumes and non-legumes which respond to lime are given.—J. J. Skinner.

1152. NOYES, H. A. *The effect of heat on the lime requirements of soils*. Jour. Amer. Soc. Agron. 11: 70-71. 1919.—It is shown from examination of samples of soil collected at different depths and in different places that reactions take place in the soil at the temperature of the steam bath that do not take place when the soil and water mixture is not heated. It is held that the Veitch method which gives the reaction between soil, water and Ca(OH)_2 at steam bath temperature does not represent the lime requirement of the soil at ordinary temperatures.—W. H. Ross.

1153. DEATRIK, E. P. *The effect of manganese compounds on soils and plants*. Cornell Univ. Agric. Exp. Sta. Mem. 19: 371-402. 1919.—See Bot. Absts. 2, Entry 1136.

1154. TRUX, ROSEY H., OTIS F. BLACK, AND JAMES W. KELLY. *Ash absorption by spinach from concentrated soil solutions*. Jour. Agric. Res. 16: 15-25. 1919.—See Bot. Absts. 2, Entry 1118.

1155. SCHOLLENBERGER, C. J. *Organic phosphorus of soil: experimental work on methods for extraction and determination*. Soil Science 6: 365-395. 1918.—Detailed descriptions of several methods used in the study of the organic phosphorus of the soil is given. It is shown that as solvents for the organic phosphorus of the soil studied, solutions of the hydroxides of the fixed alkalis are not superior to NH_3 . One extraction by NH_3 when carried out under the proper conditions was found to remove practically all the organic phosphorus from the soil that is capable of being taken into solution by NH_3 . No consistent relations were observed in these solutions between the contents of NH_3 soluble organic matter (humus), humus ash, SiO_2 , Fe_2O_3 and Al_2O_3 ; nor between the total organic matter and the organic phosphorus in NH_3 -extracts prepared in various ways, although there was a general tendency for these to vary together. The most satisfactory method for separating clay from ammoniacal soil extracts, having in view the maximum content of organic phosphorus, was found to consist

in filtering the extract through a layer of the soil itself supported by a flat paper filter on a Buchner funnel as described by MacIntire and Hardy (C. A. 9, 346). Evidence is presented that inorganic phosphorus absorbed by colloids, organic or inorganic, is not included in the apparent content of organic phosphorus as determined by the methods used. Determinations of humus, color and organic phosphorus in NH_4 -extracts of 4 depths of the soil indicate that these NH_4 -soluble constituents are present in about the same relative proportions in the 4 depths examined. The total nitrogen content of the same 4 depths of soil stand in ratios very similar to those exhibited by the NH_4 -soluble constituents named.—W. H. Ross.

1156. HOPKINS, C. G., J. G. MOSIER, E. VAN ALSTINE, AND F. W. GARRETT. **Champaign County soils.** Illinois Agric. Exp. Sta. Soil Rept. 18. 61 pp., plate 1-14, 4 maps. 1918.—A soil survey map of the county is given together with the results of chemical analyses and fertilizer experiments on the principal soil types. The soils are divided into 4 groups (a) upland prairie, (b) upland timber, (c) terrace, and (d) swamp and bottom land soils. The upland prairie soil comprise 92.2 per cent of the entire area. Upland timber soils 4.9 per cent, terrace soils 0.52 per cent and swamp soils 2.3 per cent. The upland prairie soils are higher in organic matter, and plant food elements than other soil classes except the swamp soils, which contain more organic matter. Field experiments show the soils to respond well to phosphorus when applied with nitrogen or with legumes. Manure, limestone and phosphorus produced large increased clover growth on the brown silt loam prairie soils.—J. J. Skinner.

1157. CLOUSTON, D. **Manures in their relation to soils and crop production in the central provinces.** Agric. Jour. India. 14: 101-6. 1919.—The 4 principal soils of the central provinces are described, i.e., the alluvial soils of the Nerbudda Valley, or wheat soils; the black cotton soils, and the lateritic and metamorphic rice soils. All of the soils are low in fertility and respond well to stock manure.—J. J. Skinner.

1158. DAVIS, W. **Present position and future prospects of the natural indigo industry.** IV. The effect of superphosphate manuring on the yield and quality of the indigo plant. Agric. Jour. India. 14: 21-41. 1919.—It is pointed out that the indigo industry in India is critical due to the impoverishment of the soil. Experiments conducted show that the soil is restored for indigo culture by use of phosphates. This fertilization also prevents the wilt. Stable manure and lime did not cause an increased production. The yield of indigo cake per plant is also increased by phosphate. Phosphate fertilization is concluded to be the best treatment for restoring soil for indigo culture.—J. J. Skinner.

1159. DANIEL, LUCIEN. **Cultures maraichères expérimentales au bord de la mer.** [Market gardening experiments on the sea coast.] Compt. Rend. Acad. Sci. Paris 168: 116-119. 1919.—See Bot. Absts. 3, Entry 80.

1160. LAPICQUE, L., AND E. BARNÉ. **Indice de chlore comme mesure comparative de la richesse des terres en humus.** [Chlorine Index as a measure of the comparative amount of humus in soils.] Compt. Rend. Acad. Sci. Paris 168: 118-121. 1919.—A simple method is suggested by which indications of the amount of humus in soils may be obtained. It is believed that this method will be especially useful in studying the soils of devastated regions.—V. H. Young.

1161. BERTHELOT, DANIEL, AND RENÉ TRANNOY. **Sur le pouvoir absorbant de la terre sèche ou humide vis-à-vis du chlore gazeux.** [Concerning the absorbing power of soils in contact with chlorine gas.] Compt. Rend. Acad. Sci. Paris 168: 121-123. 1919.—The chlorine absorbing power of different types of soil with varying amounts of moisture is determined.—V. H. Young.

